



INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL
TRAINING AT THE UNIVERSITY OF HELSINKI 2005–2010

RC-Specific Evaluation of IndiViDrug – Individual variability in drug response

Seppo Saari & Antti Moilanen (Eds.)



Evaluation Panel: Medicine, Biomedicine and Health Sciences

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University of Helsinki
Administrative Publications 80/31
Evaluations
2012

Publisher:
University of Helsinki

Editors:
Seppo Saari & Antti Moilanen

Title: International Evaluation of Research and Doctoral Training at the University of Helsinki 2005–2010 : RC-Specific Evaluation of IndiViDrug – Individual variability in drug response	Type of publication: Evaluations
Summary: Researcher Community (RC) was a new concept of the participating unit in the evaluation. Participation in the evaluation was voluntary and the RCs had to choose one of the five characteristic categories to participate. Evaluation of the Researcher Community was based on the answers to the evaluation questions. In addition a list of publications and other activities were provided by the TUHAT system. The CWTS/Leiden University conducted analyses for 80 RCs and the Helsinki University Library for 66 RCs. Panellists, 49 and two special experts in five panels evaluated all the evaluation material as a whole and discussed the feedback for RC-specific reports in the panel meetings in Helsinki. The main part of this report is consisted of the feedback which is published as such in the report. Chapters in the report: 1. Background for the evaluation 2. Evaluation feedback for the Researcher Community 3. List of publications 4. List of activities 5. Bibliometric analyses The level of the RCs’ success can be concluded from the written feedback together with the numeric evaluation of four evaluation questions and the category fitness. More conclusions of the success can be drawn based on the University-level report.	
RC-specific information:	
Main scientific field of research: Medicine, Biomedicine and Health Sciences	RC-specific keywords: Drug interaction, pharmacogenetics, pharmacokinetics, drug metabolism, transport, pregnancy, lactation, children, pain medicine
Participation category: 1. Research of the participating community represents the international cutting edge in its field	
RC’s responsible person: Backman, Janne	
Keywords: Research Evaluation, Meta-evaluation, Doctoral Training, Bibliometric Analyses, Researcher Community	

Series title and number: University of Helsinki, Administrative Publications 80/31, Evaluations	
ISSN: 1795-5513 (Online)	ISBN: 978-952-10-7451-6 (PDF)
Total number of pages: 83	Language: English
Additional information: Cover graphics: Päivi Talonpoika-Ukkonen Enquiries: seppo.o.saari@helsinki.fi	Internet address: http://www.helsinki.fi/julkaisut/aineisto/rc_evaluation_2012/hallinnon_julkaisu_80_31_2012.pdf

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Foreword

The evaluation of research and doctoral training is being carried out in the years 2010–2012 and will end in 2012. The steering group appointed by the Rector in January 2010 set the conditions for participating in the evaluation and prepared the Terms of Reference to present the evaluation procedure and criteria. The publications and other scientific activities included in the evaluation covered the years 2005–2010.

The participating unit in the evaluation was defined as a Researcher Community (RC). To obtain a critical mass with university-level impact, the number of members was set to range from 20 to 120. The RCs were required to contain researchers in all stages of their research career, from doctoral students to principal investigators (PIs). All in all, 136 Researcher Communities participated in this voluntary evaluation, 5857 persons in total, of whom 1131 were principal investigators. PIs were allowed to participate in two communities in certain cases, and 72 of them used this opportunity and participated in two RCs.

This evaluation enabled researchers to define RCs from the “bottom up” and across disciplines. The aim of the evaluation was not to assess individual performance but a community with shared aims and researcher-training activities. The RCs were able to choose among five different categories that characterised the status and main aims of their research. The steering group considered the process of applying to participate in the evaluation to be important, which led to the establishment of these categories. In addition, providing a service for the RCs to enable them to benchmark their research at the global level was a main goal of the evaluation.

The data for the evaluation consisted of the RCs’ answers to evaluation questions on supplied e-forms and a compilation extracted from the TUHAT – Research Information System (RIS) on 12 April 2011. The compilation covered scientific and other publications as well as certain areas of scientific activities. During the process, the RCs were asked to check the list of publications and other scientific activities and make corrections if needed. These TUHAT compilations are public and available on the evaluation project sites of each RC in the TUHAT-RIS.

In addition to the e-form and TUHAT compilation, University of Leiden (CWTS) carried out bibliometric analyses from the articles included in the Web of Science (WoS). This was done on University and RC levels. In cases where the publication forums of the RC were clearly not represented by the WoS data, the Library of the University of Helsinki conducted a separate analysis of the publications. This was done for 66 RCs representing the humanities and social sciences.

The evaluation office also carried out an enquiry targeted to the supervisors and PhD candidates about the organisation of doctoral studies at the University of Helsinki. This and other documents describing the University and the Finnish higher education system were provided to the panellists.

The panel feedback for each RC is unique and presented as an entity. The first collective evaluation reports available for the whole panel were prepared in July–August 2011. The reports were accessible to all panel members via the electronic evaluation platform in August. Scoring from 1 to 5 was used to complement written feedback in association with evaluation questions 1–4 (scientific focus and quality, doctoral training, societal impact, cooperation) and in addition to the category evaluating the fitness for participation in the evaluation. Panellists used the international level as a point of comparison in the evaluation. Scoring was not expected to go along with a preset deviation.

Each of the draft reports were discussed and dealt with by the panel in meetings in Helsinki (from 11 September to 13 September or from 18 September to 20 September 2011). In these meetings the panels also examined the deviations among the scores and finalised the draft reports together.

The current RC-specific report deals shortly with the background of the evaluation and the terms of participation. The main evaluation feedback is provided in the evaluation report, organised according to the evaluation questions. The original material provided by the RCs for the panellists has been attached to these documents.

On behalf of the evaluation steering group and office, I sincerely wish to thank you warmly for your participation in this evaluation. The effort you made in submitting the data to TUHAT-RIS is gratefully acknowledged by the University. We wish that you find this panel feedback useful in many ways. The bibliometric profiles may open a new view on your publication forums and provide a perspective for discussion on your choice of forums. We especially hope that this evaluation report will help you in setting the future goals of your research.

Johanna Björkroth
Vice-Rector
Chair of the Steering Group of the Evaluation

Steering Group of the evaluation

Steering group, nominated by the Rector of the University, was responsible for the planning of the evaluation and its implementation having altogether 22 meetings between February 2010 and March 2012.

Chair

Vice-Rector, professor **Johanna Björkroth**

Vice-Chair

Professor **Marja Airaksinen**

Chief Information Specialist, Dr **Maria Forsman**

Professor **Arto Mustajoki**

University Lecturer, Dr **Kirsi Pyhälä**

Director of Strategic Planning and Development, Dr **Ossi Tuomi**

Doctoral candidate, MSocSc **Jussi Vauhkonen**

Panel members

CHAIR

Professor Lorenz Poellinger

Cancer biology, cell and molecular biology
Karolinska Institute, Sweden

VICE-CHAIR

Professor Cornelia van Duijn

Genetic epidemiology, Alzheimer's disease and related disorders
Erasmus Medical Centre, the Netherlands

Professor Johanna Ivaska

Molecular cell biology, cell adhesion, cancer biology
University of Turku, VTT Technical Research Centre, Finland

Professor Olli Lassila

Immunology, medical microbiology
University of Turku, Finland

Professor Hans-Christian Pape

Neuroscience, neurophysiology
University of Münster, Germany

Professor Thomas Ruzicka

Dermatology, allergology
Ludwig-Maximilians-Universität (LMU) München, Germany

Professor Lars Terenius

Experimental alcohol and drug dependence research, mental disorders,
preventive medicine
Karolinska Institute, Sweden

Professor Peter York

Physical pharmaceuticals, pharmaceutical chemistry, pharmaceutical
technology
University of Bradford, Great Britain

The panel, independently, evaluated all the submitted material and was responsible for the feedback of the RC-specific reports. The panel members were asked to confirm whether they had any conflict of interests with the RCs. If this was the case, the panel members disqualified themselves in discussion and report writing.

Added expertise to the evaluation was contributed by two evaluators outside the panels and by three members from the other panels.

External Experts

Professor Olli Carpén

Pathology, cancer cell metastasis
University of Turku
Finland

Professor Anders Linde

Oral biochemi
Faculty of Odontology
Göteborg University
Sweden

Experts from the Other Panels

Professor Jan-Otto Carlsson, from the Panel of Natural Sciences

Professor Danny Huylebroek, from the Panel of Biological, Agricultural and Veterinary Sciences

Professor Holger Stark, from the Panel of Natural Sciences

EVALUATION OFFICE

Dr Seppo Saari, Doc., Senior Adviser in Evaluation, was responsible for the entire evaluation, its planning and implementation and acted as an Editor-in-chief of the reports.

Dr Eeva Sievi, Doc., Adviser, was responsible for the registration and evaluation material compilations for the panellists. She worked in the evaluation office from August 2010 to July 2011.

MSocSc Paula Ranne, Planning Officer, was responsible for organising the panel meetings and all the other practical issues like agreements and fees and editing a part the RC-specific reports. She worked in the evaluation office from March 2011 to January 2012.

Mr Antti Moilanen, Project Secretary, was responsible for editing the reports. He worked in the evaluation office from January 2012 to April 2012.

TUHAT OFFICE

Provision of the publication and other scientific activity data

Mrs Aija Kaitera, Project Manager of TUHAT-RIS served the project ex officio providing the evaluation project with the updated information from TUHAT-RIS. The TUHAT office assisted in mapping the publications with CWTS/University of Leiden.

MA Liisa Ekebom, Assisting Officer, served in TUHAT-RIS updating the publications for the evaluation. She also assisted the UH/Library analyses.

BA Liisa Jäppinen, Assisting Officer, served in TUHAT-RIS updating the publications for the evaluation.

HELSINKI UNIVERSITY LIBRARY

Provision of the publication analyses

Dr Maria Forsman, Chief Information Specialist in the Helsinki University Library, managed with her 10 colleagues the bibliometric analyses in humanities, social sciences and in other fields of sciences where CWTS analyses were not applicable.

Acronyms and abbreviations applied in the report

External competitive funding

AF – Academy of Finland
TEKES - Finnish Funding Agency for Technology and Innovation
EU - European Union
ERC - European Research Council
International and national foundations
FP7/6 etc. /Framework Programmes/Funding of European Commission

Evaluation marks

Outstanding (5)
Excellent (4)
Very Good (3)
Good (2)
Sufficient (1)

Abbreviations of Bibliometric Indicators

P - Number of publications
TCS – Total number of citations
MCS - Number of citations per publication, excluding self-citations
PNC - Percentage of uncited publications
MNCS - Field-normalized number of citations per publication
MNJS - Field-normalized average journal impact
THCP10 - Field-normalized proportion highly cited publications (top 10%)
INT_COV - Internal coverage, the average amount of references covered by the WoS
WoS – Thomson Reuters Web of Science Databases

Participation category

Category 1. The research of the participating community represents the international cutting edge in its field.
Category 2. The research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through.
Category 3. The research of the participating community is distinct from mainstream research, and the special features of the research tradition in the field must be considered in the evaluation.
Category 4. The research of the participating community represents an innovative opening.
Category 5. The research of the participating community has a highly significant societal impact.

Research focus areas of the University of Helsinki

Focus area 1: The basic structure, materials and natural resources of the physical world
Focus area 2: The basic structure of life
Focus area 3: The changing environment – clean water
Focus area 4: The thinking and learning human being
Focus area 5: Welfare and safety
Focus area 6: Clinical research
Focus area 7: Precise reasoning
Focus area 8: Language and culture
Focus area 9: Social justice
Focus area 10: Globalisation and social change

1 Introduction to the Evaluation

1.1 RC-specific evaluation reports

The participants in the evaluation of research and doctoral training were Researcher Communities (hereafter referred to as the RC). The RC refers to the group of researchers who registered together in the evaluation of their research and doctoral training. Preconditions in forming RCs were stated in the Guidelines for the Participating Researcher Communities. The RCs defined themselves whether their compositions should be considered well-established or new.

It is essential to emphasise that the evaluation combines both meta-evaluation¹ and traditional research assessment exercise and its focus is both on the research outcomes and procedures associated with research and doctoral training. The approach to the evaluation is enhancement-led where self-evaluation constituted the main information. The answers to the evaluation questions formed together with the information of publications and other scientific activities an entity that was to be reviewed as a whole.

The present evaluation recognizes and justifies the diversity of research practices and publication traditions. Traditional Research Assessment Exercises do not necessarily value high quality research with low volumes or research distinct from mainstream research. It is challenging to expose the diversity of research to fair comparison. To understand the essence of different research practices and to do justice to their diversity was one of the main challenges of the present evaluation method. Understanding the divergent starting points of the RCs demanded sensitivity from the evaluators.

1.2 Aims and objectives in the evaluation

The aims of the evaluation are as follows:

- to improve the level of research and doctoral training at the University of Helsinki and to raise their international profile in accordance with the University's strategic policies. The improvement of doctoral training should be compared to the University's policy.²
- to enhance the research conducted at the University by taking into account the diversity, originality, multidisciplinary nature, success and field-specificity,
- to recognize the conditions and prerequisites under which excellent, original and high-impact research is carried out,
- to offer the academic community the opportunity to receive topical and versatile international peer feedback,
- to better recognize the University's research potential.
- to exploit the University's TUHAT research information system to enable transparency of publishing activities and in the production of reliable, comparable data.

1.3 Evaluation method

The evaluation can be considered as an enhancement-led evaluation. Instead of ranking, the main aim is to provide useful information for the enhancement of research and doctoral training of the participating RCs. The comparison should take into account each field of science and acknowledge their special character.

¹ The panellists did not read research reports or abstracts but instead, they evaluated answers to the evaluation questions, tables and compilations of publications, other scientific activities, bibliometrics or comparable analyses.

² [Policies on doctoral degrees and other postgraduate degrees at the University of Helsinki.](#)

The comparison produced information about the present status and factors that have lead to success. Also challenges in the operations and outcomes were recognized.

The evaluation approach has been designed to recognize better the significance and specific nature of researcher communities and research areas in the multidisciplinary top-level university. Furthermore, one of the aims of the evaluation is to bring to light those evaluation aspects that differ from the prevalent ones. Thus the views of various fields of research can be described and research arising from various starting points understood better. The doctoral training is integrated into the evaluation as a natural component related to research. Operational processes of doctoral training are being examined in the evaluation.

Five stages of the evaluation method were:

1. Registration – Stage 1
2. Self-evaluation – Stage 2
3. TUHAT³ compilations on publications and other scientific activities⁴
4. External evaluation
5. Public reporting

1.4 Implementation of the external evaluation

Five Evaluation Panels

Five evaluation panels consisted of independent, renowned and highly respected experts. The main domains of the panels are:

1. biological, agricultural and veterinary sciences
2. medicine, biomedicine and health sciences
3. natural sciences
4. humanities
5. social sciences

The University invited 10 renowned scientists to act as chairs or vice-chairs of the five panels based on the suggestions of faculties and independent institutes. Besides leading the work of the panel, an additional role of the chairs was to discuss with other panel chairs in order to adopt a broadly similar approach. The panel chairs and vice-chairs had a pre-meeting on 27 May 2011 in Amsterdam.

The panel compositions were nominated by the Rector of the University 27 April 2011. The participating RCs suggested the panel members. The total number of panel members was 50. The reason for a smaller number of panellists as compared to the previous evaluations was the character of the evaluation as a meta-evaluation. The panellists did not read research reports or abstracts but instead, they evaluated answers to the evaluation questions, tables and compilations of publications, other scientific activities, bibliometrics and comparable analyses.

The panel meetings were held in Helsinki:

- On 11–13 September 2011: (1) biological, agricultural and veterinary sciences, (2) medicine, biomedicine and health sciences and (3) natural sciences.
- On 18–20 September 2011: (4) humanities and (5) social sciences.

³ TUHAT (acronym) of Research Information System (RIS) of the University of Helsinki

⁴ Supervision of thesis, prizes and awards, editorial work and peer reviews, participation in committees, boards and networks and public appearances.

1.5 Evaluation material

The main material in the evaluation was the RCs' self-evaluations that were qualitative in character and allowed the RCs to choose what was important to mention or emphasise and what was left unmentioned.

The present evaluation is exceptional at least in the Finnish context because it is based on both the evaluation documentation (self-evaluation questions, publications and other scientific activities) and the bibliometric reports. All documents were delivered to the panellists for examination.

Traditional bibliometrics can be reasonably done mainly in medicine, biosciences and natural sciences when using the Web of Science database, for example. Bibliometrics, provided by CWTS/The Centre for Science and Technology Studies, University of Leiden, cover only the publications that include WoS identification in the TUHAT-RIS.

Traditional bibliometrics are seldom relevant in humanities and social sciences because the international comparable databases do not store every type of high quality research publications, such as books and monographs and scientific journals in other languages than English. The Helsinki University Library has done analysis to the RCs, if their publications were not well represented in the Web of Science databases (RCs should have at least 50 publications and internal coverage of publications more than 40%) – it meant 58 RCs. The bibliometric material for the evaluation panels was available in June 2011. The RC-specific bibliometric reports are attached at the end of each report.

The panels were provided with the evaluation material and all other necessary background information, such as the basic information about the University of Helsinki and the Finnish higher education system.

Evaluation material

1. Registration documents of the RCs for the background information
2. Self evaluation material – answers to the evaluation questions
3. Publications and other scientific activities based on the TUHAT RIS:
 - 3.1. statistics of publications
 - 3.2. list of publications
 - 3.3. statistics of other scientific activities
 - 3.4. list of other scientific activities
4. Bibliometrics and comparable analyses:
 - 4.1. Analyses of publications based on the verification of TUHAT-RIS publications with the Web of Science publications (CWTS/University of Leiden)
 - 4.2. Publication statistics analysed by the Helsinki University Library - mainly for humanities and social sciences
5. University level survey on doctoral training (August 2011)
6. University level analysis on publications 2005–2010 (August 2011) provided by CWTS/University of Leiden

Background material

University of Helsinki

- [Basic information about the University of the Helsinki](#)
- [The structure of doctoral training at the University of Helsinki](#)
- Previous evaluations of research at the University of Helsinki – links to the reports: [1998](#) and [2005](#)

The Finnish Universities/Research Institutes

- [Finnish University system](#)
- [Evaluation of the Finnish National Innovation System](#)
- [The State and Quality of Scientific Research in Finland. Publication of the Academy of Finland 9/09.](#)

The evaluation panels were provided also with other relevant material on request before the meetings in Helsinki.

1.6 Evaluation questions and material

The participating RCs answered the following evaluation questions which are presented according to the evaluation form. In addition, TUHAT RIS was used to provide the **additional material** as explained. For giving the feedback to the RCs, the panellists received the evaluation feedback form constructed in line with the evaluation questions:

1. Focus and quality of the RC's research

- Description of
 - the RC's research focus.
 - the quality of the RC's research (incl. key research questions and results)
 - the scientific significance of the RC's research in the research field(s)
- Identification of the ways to strengthen the focus and improve the quality of the RC's research

The additional material: TUHAT compilation of the RC's publications, analysis of the RC's publications data (provided by University of Leiden and the Helsinki University Library)

A written feedback from the aspects of: scientific quality, scientific significance, societal impact, innovativeness

- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

2. Practises and quality of doctoral training

- Organising of the doctoral training in the RC. Description of the RC's principles for:
 - recruitment and selection of doctoral candidates
 - supervision of doctoral candidates
 - collaboration with faculties, departments/institutes, and potential graduate schools/doctoral programmes
 - good practises and quality assurance in doctoral training
 - assuring of good career perspectives for the doctoral candidates/fresh doctorates
- Identification of the RC's strengths and challenges related to the practises and quality of doctoral training, and the actions planned for their development.

The additional material: TUHAT compilation of the RC's other scientific activities/supervision of doctoral dissertations

A written feedback from the aspects of: processes and good practices related to leadership and management

- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

3. The societal impact of research and doctoral training

- Description on how the RC interacts with and contributes to the society (collaboration with public, private and/or 3rd sector).
- Identification of the ways to strengthen the societal impact of the RC's research and doctoral training.

The additional material: TUHAT compilation of the RC's other scientific activities.

A written feedback from the aspects of: societal impact, national and international collaboration, innovativeness

- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

4. International and national (incl. intersectoral) research collaboration and researcher mobility

- Description of
 - the RC's research collaborations and joint doctoral training activities
 - how the RC has promoted researcher mobility
- Identification of the RC's strengths and challenges related to research collaboration and researcher mobility, and the actions planned for their development.

A written feedback from the aspects of: scientific quality, national and international collaboration

- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

5. Operational conditions

- Description of the operational conditions in the RC's research environment (e.g. research infrastructure, balance between research and teaching duties).
- Identification of the RC's strengths and challenges related to operational conditions, and the actions planned for their development.

A written feedback from the aspects of: processes and good practices related to leadership and management

- Strengths
- Areas of development
- Other remarks
- Recommendations

6. Leadership and management in the researcher community

- Description of
 - the execution and processes of leadership in the RC
 - how the management-related responsibilities and roles are distributed in the RC
 - how the leadership- and management-related processes support
 - high quality research
 - collaboration between principal investigators and other researchers in the RC
 - the RC's research focus
 - strengthening of the RC's know-how
- Identification of the RC's strengths and challenges related to leadership and management, and the actions planned for developing the processes

7. External competitive funding of the RC

- The RCs were asked to provide information of such external competitive funding, where:
 - the funding decisions have been made during 1.1.2005-31.12.2010, and
 - the administrator of the funding is/has been the University of Helsinki
- On the e-form the RCs were asked to provide:
 - 1) The relevant funding source(s) from a given list (Academy of Finland/Research Council, TEKES/The Finnish Funding Agency for Technology and Innovation, EU, ERC, foundations, other national funding organisations, other international funding organisations), and
 - 2) The total sum of funding which the organisation in question had decided to allocate to the RCs members during 1.1.2005-31.12.2010.

Competitive funding reported in the text is also to be considered when evaluating this point.

A written feedback from the aspects of: scientific quality, scientific significance, societal impact, innovativeness, future significance

- Strengths
- Areas of development
- Other remarks
- Recommendations

8. The RC's strategic action plan for 2011-2013

- RC's description of their future perspectives in relation to research and doctoral training.

A written feedback from the aspects of: scientific quality, scientific significance, societal impact, processes and good practices related to leadership and management, national and international collaboration, innovativeness, future significance

- Strengths
- Areas of development

- Other remarks
- Recommendations

9. Evaluation of the category of the RC in the context of entity of the evaluation material (1-8)

The RC's fitness to the chosen participation category

A written feedback evaluating the RC's fitness to the chosen participation category

- Strengths
- Areas of development
- Other remarks
- Recommendations

Numeric evaluation: OUTSTANDING (5), EXCELLENT (4), VERY GOOD (3), GOOD (2), SUFFICIENT (1)

10. Short description of how the RC members contributed the compilation of the stage 2 material

Comments on the compilation of evaluation material

11. How the UH's focus areas are presented in the RC's research?

Comments if applicable

12. RC-specific main recommendations based on the previous questions 1-11

13. RC-specific conclusions

1.7 Evaluation criteria

The panellists were expected to give evaluative and analytical feedback to each evaluation question according to their aspects in order to describe and justify the quality of the submitted material. In addition, the evaluation feedback was asked to be pointed out the level of the performance according to the following classifications:

- outstanding (5)
- excellent (4)
- very good (3)
- good (2)
- sufficient (1)

Evaluation according to the criteria was to be made with thorough consideration of the entire evaluation material of the RC in question. Finally, in questions 1-4 and 9, the panellists were expected to classify their written feedback into one of the provided levels (the levels included respective descriptions, 'criteria'). Some panels used decimals in marks. The descriptive level was interpreted according to the integers and not rounding up the decimals by the editors.

Description of criteria levels

Question 1 – FOCUS AND QUALITY OF THE RC'S RESEARCH

Classification: Criteria (level of procedures and results)

Outstanding quality of procedures and results (5)

Outstandingly strong research, also from international perspective. Attracts great international interest with a wide impact, including publications in leading journals and/or monographs published by leading international publishing houses. The research has world leading qualities. The research focus, key research questions scientific significance, societal impact and innovativeness are of outstanding quality.

In cases where the research is of a national character and, in the judgement of the evaluators, should remain so, the concepts of "international attention" or "international impact" etc. in the grading criteria above may be replaced by "international comparability".

Operations and procedures are of outstanding quality, transparent and shared in the community. The improvement of research and other efforts are documented and operations and practices are in alignment with the documentation. The ambition to develop the community together is of outstanding quality.

Excellent quality of procedures and results (4)

Research of excellent quality. Typically published with great impact, also internationally. Without doubt, the research has a leading position in its field in Finland.

Operations and procedures are of excellent quality, transparent and shared in the community. The improvement of research and other efforts are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of excellent quality.

Very good quality of procedures and results (3)

The research is of such very good quality that it attracts wide national and international attention.

Operations and procedures are of very good quality, transparent and shared in the community. The improvement of research and other efforts are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of very good quality.

Good quality of procedures and results (2)

Good research attracting mainly national attention but possessing international potential, extraordinarily high relevance may motivate good research.

Operations and procedures are of good quality, shared occasionally in the community. The improvement of research and other efforts are occasionally documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of good quality.

Sufficient quality of procedures and results (1)

In some cases the research is insufficient and reports do not gain wide circulation or do not have national or international attention. Research activities should be revised.

Operations and procedures are of sufficient quality, shared occasionally in the community. The improvement of research and other efforts are occasionally documented and operations and practices are to some extent in alignment with the documentation. The ambition to develop the community together is of sufficient quality.

Question 2 – DOCTORAL TRAINING

Question 3 – SOCIETAL IMPACT

Question 4 – COLLABORATION

Classification: Criteria (level of procedures and results)

Outstanding quality of procedures and results (5)

Procedures are of outstanding quality, transparent and shared in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and management are documented and operations and practices are in alignment with the documentation. The ambition to develop the community together is of outstanding quality. The procedures and results are regularly evaluated and the feedback has an effect on the planning.

Excellent quality of procedures and results (4)

Procedures are of excellent quality, transparent and shared in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and management are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of excellent quality. The procedures and outcomes are evaluated and the feedback has an effect on the planning.

Very good quality of procedures and results (3)

Procedures are of very good quality, transparent and shared in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and

management are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of very good quality.

Good quality of procedures and results (2)

Procedures are of good quality, shared occasionally in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and management are documented and operations and practices are to large extent in alignment with the documentation. The ambition to develop the community together is of good quality.

Sufficient quality of procedures and results (1)

Procedures are of sufficient quality, transparent and shared in the community. The practices and quality of doctoral training/societal impact/international and national collaboration/leadership and management are occasionally documented and operations and practices are to some extent in alignment with the documentation. The ambition to develop the community together is of sufficient quality.

Question 9 – CATEGORY

Participation category – fitness for the category chosen

The choice and justification for the chosen category below should be reflected in the RC's responses to the evaluation questions 1–8.

1. *The research of the participating community represents the international cutting edge in its field.*
2. *The research of the participating community is of high quality, but the community in its present composition has yet to achieve strong international recognition or a clear break-through.*
3. *The research of the participating community is distinct from mainstream research, and the special features of the research tradition in the field must be considered in the evaluation.* The research is of high quality and has great significance and impact in its field. However, the generally used research evaluation methods do not necessarily shed sufficient light on the merits of the research.
4. *The research of the participating community represents an innovative opening.* A new opening can be an innovative combination of research fields, or it can be proven to have a special social, national or international demand or other significance. Even if the researcher community in its present composition has yet to obtain proof of international success, its members can produce convincing evidence of the high level of their previous research.
5. *The research of the participating community has a highly significant societal impact.* The participating researcher community is able to justify the high social significance of its research. The research may relate to national legislation, media visibility or participation in social debate, or other activities promoting social development and human welfare. In addition to having societal impact, the research must be of a high standard.

An example of outstanding fitness for category choice (5) ⁵

The RC's representation and argumentation for the chosen category were convincing. The RC recognized its real capacity and apparent outcomes in a wider context to the research communities. The specific character of the RC was well-recognized and well stated in the responses. The RC fitted optimally for the category.

- Outstanding (5)
- Excellent (4)
- Very good (3)
- Good (2)
- Sufficient (1)

The above-mentioned definition of outstanding was only an example in order to assist the panellists in the positioning of the classification. There was no exact definition for the category fitness.

⁵ The panels discussed the category fitness and made the final conclusions of the interpretation of it.

1.8 Timetable of the evaluation

The main timetable of the evaluation:

- | | |
|--|-----------------------|
| 1. Registration | November 2010 |
| 2. Submission of self-evaluation materials | January–February 2011 |
| 3. External peer review | May–September 2011 |
| 4. Published reports | March–April 2012 |
| - University level public report | |
| - RC specific reports | |

The entire evaluation was implemented during the university's strategy period 2010–2012. The preliminary results were available for the planning of the following strategy period in late autumn 2011. The evaluation reports will be published in March/April 2012. More detailed time schedule is published in the University report.

1.9 Evaluation feedback – consensus of the entire panel

The panellists evaluated all the RC-specific material before the meetings in Helsinki and mailed the draft reports to the evaluation office. The latest interim versions were on-line available to all the panellists on the Wiki-sites. In September 2011, in Helsinki the panels discussed the material, revised the first draft reports and decided the final numeric evaluation. After the meetings in Helsinki, the panels continued working and finalised the reports before the end of November 2011. The final RC-specific reports are the consensus of the entire panel.

The evaluation reports were written by the panels independently. During the editing process, the evaluation office requested some clarifications from the panels when necessary. The tone and style in the reports were not harmonized in the editing process. All the reports follow the original texts written by the panels as far as it was possible.

The original evaluation material of the RCs, provided for the panellists is attached at the end of the report. It is essential to notice that the exported lists of publications and other scientific activities depend how the data was stored in the TUHAT-RIS by the RCs.

2 Evaluation feedback

2.1 Focus and quality of the RC's research

- *Description of*
 - *the RC's research focus*
 - *the quality of the RC's research (incl. key research questions and results)*
 - *the scientific significance of the RC's research in the research field(s)*
- *Identification of the ways to strengthen the focus and improve the quality of the RC's research*

ASPECTS: Scientific quality, scientific significance, societal impact, innovativeness

The IndiViDrug RC is composed of 25 researchers at the Institute of Clinical Medicine and Department of Clinical Pharmacology, Faculty of Medicine, expertly led by six PIs, and is funded by the University of Helsinki (UH) and external grants. The focused research addresses the umbrella descriptions of individual variability in drug response and drug safety, covering the topics of drug interactions, pharmacogenetics and drug safety and pharmacokinetics in pregnant and young and old patient groups. The societal impact of these studies is immense with, for example, findings and outcomes from the research being incorporated internationally into clinical guidance documentation.

The RC's international cutting edge position in these areas has been strengthened during the evaluation period. Evidence is provided of breakthrough findings, and impressive statistics from all the bibliographic analyses for numbers of publications, citations and the high impact level of journals for work published across the disciplines of pharmacology, anaesthesiology, clinical neurology, neurosciences and toxicology. Additionally, the quality and scientific significance is reflected by Professor Neuvonen being recognised as an ISI Highly Cited Scientist (pharmacology) since 2005.

Overall the RC is recognised as a pioneer in the subject of individualized drug therapy which maintains a status in the field as a hot topic. The RC is the leading national centre, and a world leading international multidisciplinary research team focused on the topics cited above. A clear and distinctive research profile with convincing future potential is expressed, with future plans well defined and addressable by this outstanding RC.

Numeric evaluation: 5 (Outstanding)

2.2 Practises and quality of doctoral training

- *Organising of the doctoral training in the RC. Description of the RC's principles for:*
 - *recruitment and selection of doctoral candidates*
 - *supervision of doctoral candidates*
 - *collaboration with faculties, departments/institutes, and potential graduate schools/doctoral programmes*
 - *good practises and quality assurance in doctoral training*
 - *assuring of good career perspectives for the doctoral candidates/fresh doctorates*
- *Identification of the RC's strengths and challenges related to the practises and quality of doctoral training, and the actions planned for their development.*
- *Additional material: TUHAT compilation of the RC's other scientific activities/supervision of doctoral dissertations*

ASPECTS: Processes and good practices related to leadership and management

At the core of the doctoral training is the national Clinical Drug Research Graduate School (CDRGS), and the RC adheres to the related good practices and procedures from this source. Good practice is in place to cover student recruitment, selection, research programme management and thesis preparation and

defence, as well as en route by publishing findings in high ranking journals. The primary aim of doctoral programmes is to educate and train students in Good Clinical Practice (GCP) for carrying out drug research in various fields, and the RC is clearly successful in this ambition. Of the 11 PhDs awarded during the assessment period for doctorates exclusively from this RC, three received notable distinctions and awards – a commendable achievement and all doctorates are employed. With the current deficit in professional clinical drug researchers, the RC may consider what steps can be taken to increase the number of doctoral students whilst not diminishing the excellent levels of training and education provided.

The RC staff makes major contributions to the CDRGS activities, including the organisation of graduate training courses (up to five per annum) which are open to researchers at the University of Helsinki and attract between 40 and 150 participants for each course.

Funding for doctorate students is provided by the UH, CDRGS and the Academy of Finland, and it should be noted that some sources of funding (including some EU grants) are dependent on the pharmaceutical industry and thus may not be available to the RC which may be working in areas against the economic interests of this industry. Whilst this is clearly a potential funding issue, the RC together with other international colleagues in the field may wish to consider creating an international consortium to enter into creative and forward-looking discussion with relevant pharmaceutical company associations to address this issue. With growing interest and activity in individualized and personalized medicine by the pharma industry, the important knowledge from academic and clinic research sources in this field may now attract unbiased support.

The RC has clear and sound plans for the future development of their doctoral training programmes, especially via the increased collaboration with other groups in Finland – including merging with FinPharmaNet in 2012 to provide uniform practices in doctoral training. The proposed increase in activity in paediatric clinical pharmacology via the European Global Research in Paediatrics is also appropriate and timely and is fully supported.

Numeric evaluation: 5 (Outstanding)

2.3 The societal impact of research and doctoral training

- *Description on how the RC interacts with and contributes to the society (collaboration with public, private and/or 3rd sector).*
- *Identification of the ways to strengthen the societal impact of the RC's research and doctoral training.*
- *Additional material: TUHAT compilation of the RC's other scientific activities.*

ASPECTS: *Societal impact, national and international collaboration, innovativeness*

The findings and outputs from the research of IndiViDrug have had, and continue to have, a major and direct impact on public health nationally and internationally via the contributions made to drug interaction databases, textbooks and treatment guidelines, especially for areas that include the treatment of pain, children and patients during pregnancy.

The increased understanding of the mechanisms of drug interactions has also had major societal impact, and such research has enabled the recognition of potential drug interactions as well as, importantly, predicting such events.

All the PIs and other members of the RC have made important contributions to expert panels and advisory groups for professional and clinical agencies.

It is clear that the activities of IndiViDrug have provided major and substantial contributions to society, and will continue to do so. In addition, the RC communicated not only to the scientific community but also to the public one and thereby increasing the understanding of the problems and the benefit of this research focus.

The plans to increase linkages to the pharma industry (see comment in 2.2 above) and the regulatory authorities are important and should be followed up with vigour, to ensure that the important research findings in individualized drug therapy find maximal benefit to society as a whole.

Numeric evaluation: 5 (Outstanding)

2.4 International and national (incl. intersectoral) research collaboration and researcher mobility

- *Description of*
 - *the RC's research collaborations and joint doctoral training activities*
 - *how the RC has promoted researcher mobility*
- *Identification of the RC's strengths and challenges related to research collaboration and researcher mobility, and the actions planned for their development.*

ASPECTS: *Scientific quality, national and international collaboration*

The RC interacts closely with other research teams and groups in the field both domestically and internationally, and the PIs are all actively involved in the leading international networks of their areas of specialization within the RC's research themes. More than 40 publications have resulted from joint collaborations with overseas research groups. Additionally, the PIs have been involved with joint supervision of PhD programmes overseas in some cases.

The RC funds doctoral student mobility for research study periods overseas, and it is encouraging to note the good practice that all doctoral students present at one international congress annually.

The plans to build on this sound foundation and efforts to increase internal collaborations with other RCs of UH are appropriate. Thereby, desired increase in collaboration will be facilitated, and all members of the new consortium will be able to share good practice and governance as well as the opportunity to improve, and possibly share, infrastructure processes and systems.

Numeric evaluation: 5 (Outstanding)

2.5 Operational conditions

- *Description of the operational conditions in the RC's research environment (e.g. research infrastructure, balance between research and teaching duties).*
- *Identification of the RC's strengths and challenges related to operational conditions, and the actions planned for their development.*

ASPECTS: *Processes and good practices related to leadership and management*

The six PIs all have links into the Diagnostic and Therapeutic Department in the Institute of Clinical Medicine, and via individual PIs to the Departments of Clinical Pharmacology and Anaesthesiology. A well equipped clinical research unit is available, and crucially a research laboratory with high resolution analytical capabilities as well as being able to handle DNA samples and carry out genotyping. The maintenance and continuous improvement of analytical equipment in this laboratory is a key to the continuing excellence of the RC, and the proposed acquisition of the state of the art high specification LC/MS/MS spectrophotometer must be seen as a major priority. Access to other analytical tools not available in house is managed via the extensive collaborations of the RC, a feature that also helps to strengthen links with foreign leading research teams, and facilitate doctoral student visits. However, renewal of equipment and keeping instrumentation to 'state-of-the art' is always a challenging problem.

Teaching and clinical duties of the RC staff, and especially the PIs are heavy, with four PIs having 30 – 60% non-research duties, and two PIs up to 80 – 90% non-teaching responsibilities. Whilst such duties are recognised as very important, the RC is encouraged to search for ways to reduce these figures without disadvantaging the quality of clinical and teaching instruction. Increased allocation to research time would also facilitate the ambition to increase the number of doctoral students in the RC.

2.6 Leadership and management in the researcher community

- *Description of*
 - *the execution and processes of leadership in the RC*
 - *how the management-related responsibilities and roles are distributed in the RC*
 - *how the leadership- and management-related processes support*
 - *high quality research*
 - *collaboration between principal investigators and other researchers in the RC*
 - *the RC's research focus*
 - *strengthening of the RC's know-how*
- *Identification of the RC's strengths and challenges related to leadership and management, and the actions planned for developing the processes*

ASPECTS: Processes and good practices related to leadership and management

The RC identifies the synergistic combination of the six PIs as a strength in the leadership and management of the research and doctoral training and uses the facilities and resource of the CDRGS graduate school to strengthen these processes. Given the high quality of the performances of the RC this system works well although the union into FinPharmaNet may provide other options of good practice which may strengthen current processes.

The retirement of PI Professor Neuvonen in 2011 poses a challenge to the group and the importance of replacement to ensure sustained high quality activity by the RC in related topics and maintaining external collaborations must be urgently addressed via appropriate channels in the UH.

2.7 External competitive funding of the RC

- *The RCs were asked to provide information of such external competitive funding, where:*
 - *the funding decisions have been made during 1.1.2005–31.12.2010, and*
 - *the administrator of the funding is/has been the University of Helsinki*
- *On the e-form the RCs were asked to provide:*
 - 1) *The relevant funding source(s) from a given list (Academy of Finland/Research Council, TEKES/The Finnish Funding Agency for Technology and Innovation, EU, ERC, foundations, other national funding organisations, other international funding organizations), and*
 - 2) *The total sum of funding which the organisation in question had decided to allocate to the RCs members during 1.1.2005–31.12.2010.*

Competitive funding reported in the text is also to be considered when evaluating this point.

ASPECTS: Scientific quality, scientific significance, societal impact, innovativeness and future significance

The total funding during the assessment period is around €5m which, considering access to certain funding routes is not yet available to the RC, is a substantial sum and as a result of good success. It is noted that around 70% of external funding was from the Ministry of Education and Culture. Given the current economic issues on a global basis, the RC may wish to consider the likelihood of continued access to this level of resource from this governmental agency and search for alternative funding agencies (e.g. EU and industry – see comments in 2.2).

2.8 The RC's strategic action plan for 2011–2013

- *RC's description of their future perspectives in relation to research and doctoral training.*

ASPECTS: Scientific quality, scientific significance, societal Impact, processes and good practices related to leadership and management, national and international collaboration, innovativeness, future significance

The action plan is detailed and appropriate to maintaining the world leading cutting edge status of the InDiViDrug. Specific points within the plan have been highlighted above.

2.9 Evaluation of the category of the RC in the context of entity of the evaluation material (1-8)

The RC's fitness to the chosen participation category.

Category 1. The research of the participating community represents the international cutting edge in its field.

From the entity of the evaluation material, it is clear that the InDiViDrug RC is at the forefront of international research in its field, and plans are in place to continue and strengthen this position. The participation category is thus Category 1, in that the research of the participating community represents the international cutting edge in its field.

Numeric evaluation: 5 (Outstanding)

2.10 Short description of how the RC members contributed the compilation of the stage 2 material

The compilation process was balanced and fair, with PIs taking the leadership role in this process.

2.11 How the UH's focus areas are presented in the RC's research

Focus area 6: Clinical research

The key focus area of research and doctoral training of InDiViDrug fits perfectly into the UH's focus area 6 – 'Clinical Research'.

2.12 RC-specific main recommendations

The Panel was impressed by the overall excellent quality of the documentation from, and bibliographic statistics related to, the RC. The Panel also supports the RC's proposal to find ways to strengthen the number of doctoral supervisors and doctoral candidates, given the increasing need for such personnel. Other forward-looking plans were accepted and regarded as challenging yet realistic.

Collaboration with other RCs in appropriate areas of mutual coalescence of interests, adding strength to both/all partners, is recommended.

Efforts to increase the allocated time for the clinical staff for research are welcomed and appropriate. Further positive outcomes in this area are recommended.

Given the high impact of the outputs and the societal impact from the RC, and the recognized importance of increasing dialogue with the pharmaceutical industry, it is suggested that consideration is given by the RC to take a lead in coordinating an international academic network which would aim to interface with pharma industry consortia and regulatory bodies. The goal would be to promote open exchange of the growing knowledge data base from the research activities of the RC (and other international research groups) to accelerate the introduction of new guidelines on individual variability in drug responses. Success in this space could lead to additional support and funding from pharma in an 'unbiased' framework.

2.13 RC-specific conclusions

The Panel wishes to congratulate the RC for their excellent work, and recognize the value of their various forms of output in providing deeper understanding in the important field of individual variability in response to drugs. The societal impact and potential benefits are enormous, and the attention directed towards the paediatric and elderly groups as well as pregnant mothers, is seen as critically important.

A suggestion is made for the RC to lead an effort to increase dialogue and information exchange with the pharma industry and regulatory agencies to accelerate the introduction of new guidelines addressing patient variability to medicines.

Efforts should continue to secure additional research time for clinical staff members of the RC, where appropriate.

3 Appendices

- A. Original evaluation material
 - a. Registration material – Stage 1
 - b. Answers to evaluation questions – Stage 2
 - c. List of publications
 - d. List of other scientific activities
- B. Bibliometric analyses
 - a. Analysis provided by CWTS/University of Leiden
 - b. Analysis provided by Helsinki University Library (66 RCs)



International evaluation of research and doctoral training
at the University of Helsinki 2005-2010

RC-SPECIFIC MATERIAL FOR THE PEER REVIEW

NAME OF THE RESEARCHER COMMUNITY:

Individual variability in drug response (IndiViDrug)

LEADER OF THE RESEARCHER COMMUNITY:

Professor Janne Backman, Clinical Pharmacology, Institute of Clinical Medicine, Faculty of
Medicine

RC-SPECIFIC MATERIAL FOR THE PEER REVIEW:

- Material submitted by the RC at stages 1 and 2 of the evaluation
 - STAGE 1 material: RC's registration form (incl. list of RC participants in an excel table)
 - STAGE 2 material: RC's answers to evaluation questions
- TUHAT compilations of the RC members' publications 1.1.2005-31.12.2010
- TUHAT compilations of the RC members' other scientific activities 1.1.2005-31.12.2010
- Web of Science(WoS)-based bibliometrics of the RC's publications data 1.1.2005-31.12.2010 (analysis carried out by CWTS, Leiden University)

NB! Since Web of Science(WoS)-based bibliometrics does not provide representative results for most RCs representing humanities, social sciences and computer sciences, the publications of these RCs will be analyzed by the UH Library (results available by the end of June, 2011)



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RC-SPECIFIC STAGE 1 MATERIAL (registration form)

1 RESPONSIBLE PERSON

Name: Backman, Janne

E-mail:

Phone: +358947173914

Affiliation: Medical Faculty, Inst Clin Med, Department of Clinical Pharmacology

Street address: Tukholmankatu 8C, 00290 Helsinki

2 DESCRIPTION OF THE PARTICIPATING RESEARCHER COMMUNITY (RC)

Name of the participating RC (max. 30 characters): Individual variability in drug response

Acronym for the participating RC (max. 10 characters): IndiViDrug

Description of the operational basis in 2005-2010 (eg. research collaboration, joint doctoral training activities) on which the RC was formed (MAX. 2200 characters with spaces): The "Individual variability in drug response - significance of drug interactions and pharmacogenetics" researcher community (RC) is characterized by a unique combination of competency in chemical analytics of drugs and their metabolites, expertise in pharmacokinetics, and deep understanding of drug interactions and pharmacogenetics, coupled with skills and capacity to carry out clinical research. The RC is formed by six internationally recognized principal investigators (Pertti J. Neuvonen, Mikko Niemi, Kalle Hoppu, Heli Malm, Eija Kalso and Janne T. Backman) and their research groups. The principal investigators have been working already before the evaluation period in close research collaboration on five focus areas related to the title of the RC: drug-drug interactions (PJN, JTB, MN, EK), pharmacogenetics (MN, PJN, EK, JTB), and drug responses during pregnancy and lactation (HM, KH, PJN), in infants and children of different ages (KH, JTB, PJN, MN) and in treatment of pain (EK, JTB, PJN, KH). In these research topics, it has been essential to utilize the strengths of each individual research group, including pharmacokinetic (PJN, MN, JTB), pharmacogenetic (MN), teratologic (HM), pain medicine (EK) and pediatric (KH) expertise.

The motivation for the collaboration has arisen from a common interest in drug safety, variability in drug response and individualization of drug treatment. All principal investigators have published original research papers with some or all of the other investigators, reflecting integrity of the RC. All principal investigators have also been actively collaborating and participating in doctoral training as senior researchers and supervisors (often joint supervision) in the national Clinical Drug Research Graduate School (CDRGS), which provides education and funding for doctoral students, and strengthens the operational basis of this RC. This RC actually forms an essential operational core unit of CDRGS, directed by PJN and JTB. All the principal investigators have collaborated as active organizers, lecturers and teachers on many of the postgraduate courses provided by CDRGS.



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3 SCIENTIFIC FIELDS OF THE RC

Main scientific field of the RC's research: medicine, biomedicine and health sciences

RC's scientific subfield 1: Pharmacology and Pharmacy

RC's scientific subfield 2: --Select--

RC's scientific subfield 3: --Select--

RC's scientific subfield 4: --Select--

Other, if not in the list:

4 RC'S PARTICIPATION CATEGORY

Participation category: 1. Research of the participating community represents the international cutting edge in its field

Justification for the selected participation category (MAX. 2200 characters with spaces): During 2005-2010, the RC has studied individual variability in drug metabolism and transport, and the efficacy and safety of drug treatments in special patient groups (e.g., pregnant women, children). The RC has uncovered many clinically important drug interactions, including those with lipid-lowering, cardiovascular, glucocorticoid, anti-infective, antidiabetic, antiasthmatic, analgesic and psychotropic drugs. The findings have markedly increased the understanding of the mechanisms of drug interactions related to the biotransformation and transport of drugs. In addition to directly improving patient care, and being commonly cited in clinical textbooks and guidelines, the findings of the RC's systematic research have greatly improved the principles and guidelines applied in drug development, so that adverse drug interactions can now be predicted and studied at an early stage of drug development. Accordingly, the RC's international cutting edge position in drug interaction research, achieved already years ago, was maintained or even strengthened during the evaluation period.

In addition, during the last years, the RC has achieved a break-through in the pharmacogenetic focus area, reaching a cutting-edge position in transporter pharmacogenetics, as acknowledged by the Anders Jahre Prize for Young Scientists, awarded to MN in 2010. The pivotal studies were focused on the effects of transporter pharmacogenetics on the pharmacokinetics of statins. As a result, a gene test for SLCO1B1 polymorphisms has already been implemented to clinical use. During recent years, pharmacogenetic research has been extended to novel target areas and drugs, and represents now a true cutting edge area raising considerable interest in the scientific society worldwide.

In the wider context of variability in drug response, the RC is empowered by the international leading positions of its investigators. KH is the leading authority in the development of pediatric drug research and education networks both in Finland and in Europe, EK is in a leading position in international pain research community and HM is internationally networked in teratologic research.

5 DESCRIPTION OF THE RC'S RESEARCH AND DOCTORAL TRAINING

Public description of the RC's research and doctoral training (MAX. 2200 characters with spaces): Drug therapy plays a central role in the treatment of most diseases. However, the response to drugs varies



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widely between individuals, and only 25% to 80% of patients respond beneficially to a given drug therapy. On the other hand, some individuals cannot tolerate all drugs. In fact, adverse drug reactions have been found to cause about 7% of hospitalizations, and fatal adverse drug reactions have been estimated to be the fourth to sixth leading cause of death. Both anticipated positive health effects and unwanted toxicities of drugs are determined by a complex interplay of patient characteristics (e.g., age, body size, genes, sex, pregnancy and lactation, health, liver and kidney function) and environmental factors (e.g., diet, drug interactions). The research groups of the IndiViDrug RC carry out top quality clinical drug research in the following focus areas of interindividual variability in drug response: drug-drug interactions, pharmacogenetics, and drug responses during pregnancy and lactation, in infants and children of different ages and in the treatment of pain. In all the focus areas, the core of research is based on the profound understanding and know-how of the community in clinical drug research in special patient groups and in drug interactions and pharmacogenetic variability related to drug metabolism and transport.

The research of the RC is strongly coupled with doctoral training via the national Clinical Drug Research Graduate School (CDRGS), and a majority of the RC's original publications are included in doctoral theses. The main aim of the RC's doctoral training is to educate Good Clinical Practice (GCP) level professional scientists for the planning, management and critical evaluation of clinical drug research in various fields of the society. The doctoral students take lessons on theoretical and professional skills, and perform relevant research to achieve a PhD degree within four years. Currently, there is a significant deficit of professional clinical drug researchers, which has, for example, caused significant delays in pharmaceutical drug development. Thus, there is a great societal demand for the doctoral training provided by the RC.

Significance of the RC's research and doctoral training for the University of Helsinki (MAX. 2200 characters with spaces): As a RC focusing on clinical drug research and individual variability in drug response, the IndiViDrug RC strengthens the Medical Faculty's profile as a high quality centre for clinical research and a pioneer in individualized drug therapy. Clinical drug research is also one of the functional focus areas of the RC's home institute, Institute of Clinical Medicine. The main research areas, drug interactions and pharmacogenetic variability related to drug metabolism and transport, are currently the hottest areas of research in clinical pharmacology, which makes the RC and its home University extremely well known worldwide. The research of the RC is also generally highly influential, having a direct impact on the practice of drug therapy and also on the principles of clinical drug development. For example, the drug interaction and pharmacogenetic findings of the group have directly penetrated to treatment guidelines, drug interaction databases, and guidelines applied in pharmacokinetic research during drug development, which adds to the visibility of the University. Moreover, the RC attracts both national and international doctoral students and postdoctoral researchers more than it is possible to recruit, which increases the significance of the RC to the University.

The RC plays an important role also in training clinical drug research professionals. The PI's of the IndiViDrug community play a pivotal role in directing and organizing doctoral training within the national Clinical Drug Research Graduate School. The community has organized yearly about 5 postgraduate courses, with 40-150 participants in each, dealing with central topics of clinical drug research, e.g., methods in clinical drug research, pharmacogenetics, pharmacokinetics, pediatric drug research, pharmacoepidemiology, and adverse drug reactions. These courses are generally open to all doctoral students at the University of Helsinki. All the graduated doctors of the RC have been employed immediately after dissertation, which demonstrates the relevance and need of doctoral training provided by the RC.



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Keywords: Drug interaction, pharmacogenetics, pharmacokinetics, drug metabolism, transport, pregnancy, lactation, children, pain medicine

6 QUALITY OF RC'S RESEARCH AND DOCTORAL TRAINING

Justified estimate of the quality of the RC's research and doctoral training at national and international level during 2005-2010 (MAX. 2200 characters with spaces): In 2005-2010, the RC published groundbreaking findings concerning interindividual variability in drug response, with main focus on drug interactions, special patient groups and pharmacogenetics. During the period, the RC published about 160 scientific articles in top international journals, i.e., about 27 articles/year. As many as 24 (15%) of them were published in the highest ranking journal publishing original research in clinical pharmacology (Clinical Pharmacology & Therapeutics, IF 6.96), and 8 (5%) of the articles in the highest ranking journal in anesthesiology (Pain, IF 5.37). Already by 30.11.2010, the total number of citations to the 160 articles was about 2200 (14/article), reflecting the high scientific quality of research. Many of them were cited frequently (26 articles cited at least 26 times). The relevance of the results is shown by their immediate penetration to treatment guidelines, drug interaction databases, and scientific principles applied in clinical drug development, enabling detection and prediction of adverse drug interactions at an early stage. One of the investigators (MN) was awarded The Anders Jahre Prize for Young Scientists in 2010 (a recognition of outstanding scientific achievements in the Nordic countries). One of the investigators (PJM) belongs to the Highly Cited Scientists within the category Pharmacology (www.isihighlycited.com) since 2005.

The RC forms the core of the national Clinical Drug Research Graduate School, which provides education and funding for doctoral students, and is the mainstay of the high quality of doctoral training provided by the RC. The principal investigators have supervised 11 doctoral theses that were completed within the RC. Two of these were accepted with distinction (18% of theses), three were selected as the best clinical pharmacology theses in 2005, 2008 and 2009 in Finland, and one was awarded the best 2008 thesis by the University of Helsinki and by the Finnish Medical Journal. These awards, together with the high number of citations to the thesis work, reflect the high quality of the research and doctoral training. All the graduated doctors were employed immediately after dissertation.

Comments on how the RC's scientific productivity and doctoral training should be evaluated (MAX. 2200 characters with spaces): The RC's scientific output should be assessed within the subject category Pharmacology & Pharmacy, based on the number of original articles per principal investigator, journal impact factors and the number of citations to articles. The number of citations can better reflect the quality and relevance of research than do impact factors. When comparisons between RCs in different subject categories are needed, bibliometric quality indicators (number of publications and citations, IF) should be related to the percent contribution of RC members to each publication and to journal ranking within its subject category, excluding review journals. Moreover, the quantitative output should be related to "full-time principal investigator years" in 2005-2010, taking into account part-time affiliations and the load of teaching and administrative responsibilities of the investigators. In addition, the national and international prizes awarded to the investigators and their Highly Cited status should be acknowledged. External funding is not a fully appropriate quality criterion in the RC's area focusing on adverse drug effects and interactions. Many grants, even EU grants, are dependent of pharmaceutical industry, and the RC's research topics can be against their economic interest.



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RC-SPECIFIC STAGE 1 MATERIAL (registration form)

Doctoral training can be evaluated by analyzing the number of completed and ongoing dissertations per number of RC's professorship years. The quality of each doctoral training project is best evaluated by analyzing the sum of journal impact factors of each thesis and the ranks of these journals within the subject category, and by calculating the total number of citations to the original articles for each thesis. In addition, the evaluation should take into account the percentage of theses accepted with distinction and the awards given to them. Moreover, the quality could be evaluated by analyzing the doctoral training infrastructure and amount of postgraduate courses provided and organized by the RC.

The publishing strategy of the RC is to produce high quality original research articles and publish a majority of them in the highest ranking journals in Pharmacology & Pharmacy and Anesthesiology.

LIST OF RC MEMBERS

NAME OF THE RESEARCHER COMMUNITY:			Individual variability in drug response - significance of drug interactions and pharmacogenetics (IndiViDrug)		
RC-LEADER			J. Backman		
CATEGORY			1		
	Last name	First name	PI-status (TUHAT, 29.11.2010)	Title of research and teaching personnel	Affiliation
1	Ahonen	Kati		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
2	Backman	Janne	x	Clinical instructor, Docent	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
3	Fanta	Samuel		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
4	Filppula	Anne		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
5	Heiskanen	Tarja		Postdoctoral researcher	Medical Faculty, Institute of Clinical Medicine, Anaesthesiology and Helsinki University Central Hospital, Pain Clinic and Department of
6	Hoppu	Kalle	x	Senior researcher, Docent	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology & HUSLAB
7	Honkalampi	Johanna		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
8	Isohanni	Mika		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
9	Jaakkola	Tiina		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
10	Kajosaari	Lauri		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
11	Kalliokoski	Annikka		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
12	Kalso	Eija	x	Professor	Medical Faculty, Institute of Clinical Medicine, Anaesthesiology
13	Pitkänen (Karjala)	Marjo		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
14	Karonen	Tiina		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
15	Keskitalo	Jenni		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
16	Lilja	Jari		Postdoctoral researcher, Docent	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
17	Malm	Heli	x	Doctoral candidate - postdoctoral researcher	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology & HUSLAB
18	Neuvonen	Pertti	x	Professor	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
19	Niemi	Mikko	x	University researcher - Professor	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
20	Pasanen	Marja		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
21	Ruokoniemi	Päivi		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
22	Schröder (Granfors)	Marika		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
23	Tapaninen	Tuija		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
24	Tornio	Aleksi		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology
25	Xiang	Xiaoqiang		Doctoral candidate	Medical Faculty, Institute of Clinical Medicine, Clinical Pharmacology



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RC-SPECIFIC STAGE 2 MATERIAL

BACKGROUND INFORMATION

Name of the RC's responsible person: Backman, Janne Tapio

E-mail of the RC's responsible person:

Name and acronym of the participating RC: Individual variability in drug response, IndiViDrug

The RC's research represents the following key focus area of UH: 6. Kliininen tutkimus – Clinical research

Comments for selecting/not selecting the key focus area: The key focus area of the RC's research and doctoral training is clinical drug research (variability in drug response - significance of drug interactions and pharmacogenetics).

1 FOCUS AND QUALITY OF RC'S RESEARCH (MAX. 8800 CHARACTERS WITH SPACES)

- **Description of the RC's research focus, the quality of the RC's research (incl. key research questions and results) and the scientific significance of the RC's research for the research field(s).**

The focus has been in the factors causing individual variability in drug response, particularly in the effect of drug interactions and pharmacogenetics (Appendix 1, Figure 1). Also the effect of immature and developing body functions, fragility, and pregnancy on drug safety has been studied. The importance of the research focus is underlined by the reports that drugs cause about 100 000 deaths annually in the USA. During 2005-10, The RC has published about 175 publications in international journals, many of which are leading journals of their field. These publications have been cited about 2800 times (by 28.2.2011). The quality and scientific significance is reflected also by the fact that one of the RC members (PJN) has been an ISI Highly Cited Scientist (pharmacology) since 2005 – there are not too many Finnish scientists ranked in this list.

1. Drug interactions

Most drugs are eliminated by drug metabolism, a process where microsomal cytochrome-P450 (CYP) enzymes are crucial. However, the role of specific CYP isoenzymes in the metabolism of several drugs is unknown.

Research question: Our hypothesis was that there is inadequate or misleading product information regarding the metabolism of many drugs and their liability to interactions, and that even unrecognized interaction mechanisms may exist between drugs in clinical use.

Results.

The RC has uncovered several previously unknown adverse drug interactions, including those with opioids, lipid-lowering drugs, cardiovascular drugs, glucocorticoids, anti-infectives, oral antidiabetics, antiasthmatics, and psychotropic drugs and NSAIDs. These findings were not based on "fishing" experimentation but on deep evaluation and understanding of the properties of potential victim and "perpetrator" drugs. Our experience in the field and innovative in vitro studies guided us to perform targeted drug interaction studies in humans. Drug interactions causing 5-10-fold or even more increased exposures to the victim drug (e.g. between rofecoxib-tizanidine, gemfibrozil-repaglinide) or drastic



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RC-SPECIFIC STAGE 2 MATERIAL

decreases in drug concentration (e.g. rifampicin-oxycodone) were found. Our results have significantly improved the safety of drug treatment, and are cited in textbooks, guidelines and interaction alerts world-widely.

The RC has identified the previously unrecognized important role of the CYP2C8 isoenzyme as a mediator of many drug interactions. The RC showed that CYP2C8 is the crucial isoenzyme in the metabolism of repaglinide, pioglitazone, rosiglitazone, cerivastatin, and montelukast. Other enzymes had been reported to be crucial by drug companies, because they had used irrelevant substrate concentrations in their studies.

The RC has found and validated several new tools and probe drugs to be used in interaction research in humans. Many of these findings have been implemented to the guidelines of, e.g., FDA and EMEA. Our results and recommendations have significantly improved the interaction research principles applied in Pharma industry, so that interactions can now be better predicted already during drug development. Drug interaction research has become one of the main topics within clinical pharmacology, and the RC's has the international cutting edge position in drug interaction research.

2. Pharmacogenetics

The understanding of the role of various membrane transporters in the pharmacokinetics and effects of different drugs has been in its infancy until recent years. Also the significance of pharmacogenetics in the variation of drug response and interactions has been poorly understood.

Our Research target was a clarification of potential importance of certain cell membrane transporters, particularly of organic anion transporting polypeptides (OATPs), P-glycoprotein, and breast cancer resistance protein (BCRP) in the pharmacokinetics of statins and some other drugs, and to resolve the significance of pharmacogenetic polymorphisms in these transporter functions and in interindividual variation in drug exposure and risk of muscle toxicity of statins.

Results

The RC has shown that OATP1B1 has a crucial role in the liver uptake of many statins, and that its effect on different statins and their metabolites varies greatly between humans. A genetic polymorphism causing impaired OATP1B1 function increased the average plasma exposure to the active simvastatin acid more than 3-fold, to atorvastatin more than 2-fold, and to pravastatin and rosuvastatin nearly 2-fold, but had no effect on fluvastatin. These findings were the first to demonstrate the diverse effect of a SNP on the pharmacokinetics of different statins and allowed us to predict the effect of SLCO1B1 (encoding OATP1B1) polymorphism on the risk of dose-dependent muscle toxicity of simvastatin and other statins. Recent large scale pharmacoepidemiologic studies (e.g. SEARCH) have confirmed the relevance of our findings. The RC also demonstrated that the geographic distribution of the SLCO1B1 polymorphism varies greatly. Genetic differences between populations correlated well with the geographical distances considering likely routes of migration of humans out of Africa. The functionally significant *1B haplotype showed the highest frequencies in populations near the equator, whereas the frequency of *15 increased toward north. The data suggest that natural selection may have shaped the global distribution of SLCO1B1 variants.



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RC-SPECIFIC STAGE 2 MATERIAL

The RC has shown that a polymorphism in the ABCG2 gene, which causes a reduced activity of the BCRP transporter, considerably increases the exposure to atorvastatin, rosuvastatin, fluvastatin and simvastatin lactone but has no profound effect on the pharmacokinetics of pravastatin or simvastatin acid. The RC has also shown that a common haplotype of the ABCB1 gene (encoding the efflux transporter P-glycoprotein) increases the exposure to simvastatin acid and atorvastatin, without significant effects on the pharmacokinetics of fluvastatin, pravastatin, lovastatin and rosuvastatin.

The RC has achieved a break-through in the pharmacogenetic focus area, reaching a cutting-edge position in transporter pharmacogenetics, as acknowledged by the Anders Jahre Prize for Young Scientists, awarded to MN in 2010, and by the Helsinki University's best doctoral thesis award (to Marja Pasanen in 2009). The pharmacogenetic research has been extended to novel target areas and drugs, and represents now a true cutting edge area raising considerable interest in the scientific society worldwide.

3. Pregnancy, immature body functions and fragility.

Research question: The effects of pregnancy and lactation, immature and developing body functions, and fragility on drug response, pharmacokinetics and drug safety are not known although many drugs are used in patients belonging to these groups.

Results. The safety of drugs, particularly of serotonin reuptake inhibitors, during pregnancy and lactation was evaluated in pharmacoepidemiologic studies, which have expanded to an ongoing EU- and NIH-supported research network. The pharmacokinetics or effects of cyclosporine, fluconazole, pravastatin, and triptans in children and adolescent differed from those in adults underlining the need of dosing guidelines based on the maturation status of these patients. Considerably increased exposures to intravenous and oral oxycodone and paracetamol occurred in elderly patients, when the doses were not decreased from those used in younger adults.

- **Ways to strengthen the focus and improve the quality of the RC's research.**

The RC will continue in the present topic areas - the factors causing variability in drug response - also during the next 3-5 years. The quality of research will be further developed by

1) Closer co-operation with clinicians and researchers at FIMM and Pharmaceutical Faculty. The effect of pharmacogenetics, drug-drug interactions, nutrient-drug interactions and membrane transporters on variability in drug response, and as a cause of adverse drug effects, will be studied in more detail.

2) Information technology will be applied to identify factors explaining unusual drug response. In vitro – in vivo simulations of drug-drug interactions will be developed. Pharmacokinetic-pharmacodynamic modelling and population pharmacokinetics will be applied to experimental and clinical data.

3) Post-doctoral researchers will be recruited to the RC to improve the supervision of doctoral students and to strengthen the quality of research.

4) Updating the LC-MS/MS equipment in the laboratory of clinical pharmacology to allow highly sensitive analytics of drugs and their metabolites.



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RC-SPECIFIC STAGE 2 MATERIAL

2 PRACTISES AND QUALITY OF DOCTORAL TRAINING (MAX. 8800 CHARACTERS WITH SPACES)

- How is doctoral training organised in the RC? Description of the RC's principles for recruitment and selection of doctoral candidates, supervision of doctoral candidates, collaboration with faculties, departments/institutes, and potential graduate schools/doctoral programmes, good practises and quality assurance in doctoral training, and assuring good career perspectives for the doctoral candidates/fresh doctorates.

The doctoral training of the IndiViDrug researcher community (RC) is based on the efforts of six internationally recognized principal investigators (Pertti J. Neuvonen, Mikko Niemi, Kalle Hoppu, Heli Malm, Eija Kalso and Janne T. Backman; Appendix 1, Figure 2). Their closely collaborating research groups are focused on areas related to individual variability in drug response.

The principal investigators of the RC have supervised 11 doctoral theses that have been completed during the evaluation period in the RC (and a number of theses not in the scope of the RC). Two of them were accepted with distinction (Annikka Kalliokoski and Marja Pasanen), and three of them were awarded the annual best thesis award of the Finnish Society for Clinical Pharmacology and Therapeutics (Marika Granfors, Marja Pasanen and Samuel Fanta). Marja Pasanen also got the Finnish Pharmacological Society (2009), University of Helsinki (2010), and Finnish Medical Journal (2010) thesis awards. These awards and distinctions are clear indicators of the exceptionally high quality of the RC's doctoral training and its practices. In addition to the above mentioned theses, the investigators have participated as co-supervisors in a similar number of other thesis projects and are currently supervising about 10 ongoing thesis projects.

The research of the RC is strongly coupled with doctoral training via the national Clinical Drug Research Graduate School (CDRGS, funded by the Ministry of Education and Culture), which is directed by two of the principal investigators of the RC (P.J.N. and J.T.B.). All principal investigators of the RC have been actively collaborating and participating in the CDRGS. CDRGS provides doctoral training in the following universities: University of Helsinki, University of Turku, University of Tampere, University of Eastern Finland (Kuopio) and University of Oulu. During 2005-2010 altogether 32 PhD theses have been completed in CDRGS. CDRGS has had 5-9 annual national graduate school positions during the evaluation period. This graduate school provides education and funding for doctoral students, and forms the operational core of the RC's doctoral training. All the principal investigators have collaborated as active organizers, lecturers and teachers on many of the postgraduate courses provided by CDRGS. In addition to the graduate school positions, the RC has 3 training positions that have been available for doctoral students.

The main aim of the RC's doctoral training is to educate Good Clinical Practice (GCP) level professional scientists for the planning, management and critical evaluation of clinical drug research in various fields of the society. The doctoral students take lessons on theoretical and professional skills, and perform relevant research to achieve a PhD degree within four years. All doctoral students working in the IndiViDrug research groups have the possibility to join CDRGS. Accordingly, the principles and practices of doctoral training in the RC are based on the practices applied by the CDRGS, as well as on the principles of the Medical Faculty. In the RC, graduate school and other training positions are announced in national newspapers, in web based media (University website, CDRGS website), and via research



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networks, when new positions become available (approximately once in 1-2 years). Selected positions can also be announced internationally. Both domestic and foreign applications are accepted.

The evaluation of the applicants is carried out by the principal investigators of the RC, and in case of graduate school positions, by the Board of the CDRGS graduate school. Doctoral candidates are selected on the basis of the quality and suitability of the research protocol and the applicant's personal competence (education and skills, previous experience). In clinical drug research in patients and healthy volunteers, a prerequisite for the candidates is usually MD education and a good command of Finnish (and/or Swedish) language. This limits the possibilities of the RC in recruiting foreign students. Despite this limitation, highly qualified foreign students have been selected regularly for laboratory oriented research projects in the RC.

The recommendation of the RC is that, in order to ensure adequate supervision and high quality of doctoral training, each doctoral candidate has two qualified and dedicated principal supervisors and additional co-supervisors as necessary. The principle of the RC is that the supervisors take the responsibility of the feasibility, progress, and scientific quality of the thesis project. Thus, in addition to the motivation, skills and efforts of the candidate, supervisors are a critical component in the quality assurance of doctoral training. If necessary, doctoral training is carried out in collaboration with other departments and faculties. A good example of international collaboration is the thesis of Samuel Fanta, in which all original publications were carried out in collaboration with a Swedish research group (Mats Karlsson in University of Uppsala, who also provided co-supervision to the project).

In the beginning of the project, each candidate makes a detailed doctoral training plan, including a research protocol and an outline of suitable theoretical courses. The RC also recommends a thesis committee of 2-3 external experts. The progress and quality of each thesis project, including research and theoretical studies, is controlled annually by the supervisors and in regular thesis committee meetings. If there are concerns about the progress of the thesis project (eg exceeding 3-4 years of full-time work), the supervisors and thesis committee will consider changes to the initial protocol.

In the RC, postgraduate courses are organized in close collaboration with CDRGS and with other national FinPharmaNet graduate schools: Drug Discovery Graduate School (DDGS), Graduate School in Pharmaceutical research (GSPR) and Finnish Graduate School in Toxicology (ToxGS). These graduate schools are active both in the Medical Faculty and in The Faculty of Pharmacy. This collaboration enables, on a national level, the availability of multidisciplinary courses covering all aspects of pharmacology and drug research, and is a strong asset of the RC. Together with the CDRGS, the RC has been responsible for the organization of 6-10 postgraduate courses annually, covering topics of clinical drug research, such as methods in clinical drug research, pharmacokinetics, pharmacogenetics, pharmacoepidemiology, pediatric drug research, adverse effects of drugs and career perspectives in the area of clinical drug research. In many of the courses, the language is English, and the lecturers are internationally recognized or even foreign experts.

All graduated doctorates have been employed immediately after graduation, both to the public and private sectors. The training provided by the RC produces researchers that are skilled in the design, conduct and critical evaluation of clinical drug investigations. Such researchers and experts are highly demanded in the industry as well as in the public sector, and at present there is actually a shortage of trained professionals in clinical drug research in Finland, which has, for example, caused significant



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delays in pharmaceutical drug development. Thus, there is a great societal demand for the doctoral training provided by the RC. Therefore, the content and focus of the training provided by the RC ascertains excellent career perspectives for the doctorates.

- RC's strengths and challenges related to the practises and quality of doctoral training, and the actions planned for their development.
The strengths are 1) the attractive, clinically relevant research topics, 2) the resources of CDRGS (5-9 graduate school positions; Academy of Finland funding for courses and travel expenses; good practices), and 3) the balanced training program, covering design, conduct and evaluation of clinical drug investigations. The challenges are 1) how to develop supervisor and training resources in various aspects of clinical drug research, 2) how to improve practices, and 3) how to motivate researchers to post-doc visits abroad.

The doctoral training will be developed, e.g., as follows: 1) The RC will strengthen collaboration with the FinPharmaNet graduate schools, DDGS, GSPR and ToxGS, which will unite with CDRGS in 2012 to the FinPharma Doctoral Program, FPDP, where CDRGS acts as a separate sector (led by J Backman). Thereafter, the RC will adapt uniform practices with FPDP, including e.g., obligatory thesis committees. 2) The RC will develop its resources in pediatric clinical pharmacology via the European "Global Research in Paediatrics (GRIP)" training program chaired by K Hoppu.

3 SOCIETAL IMPACT OF RESEARCH AND DOCTORAL TRAINING (MAX. 4400 CHARACTERS WITH SPACES)

- Description of how the RC interacts with and contributes to the society (collaboration with public, private and/or 3rd sector).
The RC has uncovered many clinically important drug interactions, and made findings concerning drug treatment of pain, and drug treatments in children and during pregnancy. Many findings have been implemented to drug interaction databases (e.g., SFINX), textbooks and treatment guidelines, available for physicians around the world. Thus, by directly improving patient care, the findings have a positive public health impact. Moreover, the RC's systematic research findings have markedly increased the understanding of the mechanisms of drug interactions involving metabolism and transport of drugs, and improved the principles applied in drug development, so that adverse drug interactions can be predicted and studied early. Moreover, drug information producing companies (e.g., Medbase) directly benefit from the research of the RC. These developments have a remarkable societal impact to public and private sectors.

The pharmacogenetic studies of the RC uncovered new effects of transporter pharmacogenetics on statin pharmacokinetics. A test for SLCO1B1 genetic variants, predicting muscle toxicity of statins, has already been implemented to clinical use in several countries, highlighting the impact of the work on principles of medical treatment. The methodology used by the RC serves as an example on how to design pharmacogenetic studies so that basic research findings can be translated to the clinic with a seamless chain of evidence in a cost-effective manner and with great confidence to findings. The RC has research collaboration with the industry, and some joint publications are under preparation. For obvious reasons, i.e., the principal research focus of the RC is on issues related to drug safety, the findings are more of the interest to the public sector than to industry, and there are few possibilities for collaboration with Pharma industry.



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RC-SPECIFIC STAGE 2 MATERIAL

The leading expert positions of the investigators are part of the RC's societal impact (Appendix 1, Figure 2). Backman, Neuvonen and Niemi are important national-level experts in clinical pharmacology and pharmacogenetics. They have crucially contributed to national doctoral training in the CDRGS graduate school (PN is the founder and leader). E Kalso has a leading position in pain medicine (President of International Association for the Study of Pain), K Hoppu in pediatric pharmacology (board member of International Union of Pharmacology and Clinical Pharmacology, chairman of Pediatric Pharmacology Section), and Heli Malm in teratology (internationally networked). K Hoppu is also a leading authority in the development of pediatric pharmacology networks in Europe.

In doctoral training, the RC has collaborated with national authorities and industry. Many employees of the authorities and industry have joined the RC and doctorates from the RC have been employed by the authorities and industry. Both sectors have a representative in the Board of the graduate school network (FinPharmaNet) of CDRGS. Doctorates have also been employed in public sector organizations and the public health system. The researchers and experts educated by the RC are highly demanded, and there is even a shortage of trained professionals in clinical drug research in Finland. Thus, there is a great societal demand for the training provided by the RC.

- Ways to strengthen the societal impact of the RC's research and doctoral training.
The societal impact of the RC's research and doctoral training can be strengthened by improving the integration of the industry and authorities to the work of the RC. To this end, joint research and education projects are already being prepared, and the roles of these sectors will be strengthened in the future FinPharma Doctoral Program. For example, these sectors will be utilized in the planning of the doctoral program curriculum and in the planning and conduct of collaborative doctoral training courses.

For the Finnish society, it will be extremely important to respond to the high demand of professionals in clinical drug research. Therefore, the RC is seeking ways to increase the number of supervisor and graduate student positions in the university, in order to guarantee an adequate output of doctorates in clinical drug research in the future.

4 INTERNATIONAL AND NATIONAL (INCL. INTERSECTORAL) RESEARCH COLLABORATION AND RESEARCHER MOBILITY (MAX. 4400 CHARACTERS WITH SPACES)

- Description of the RC's research collaborations and joint doctoral training activities and how the RC has promoted researcher mobility.
The principal investigators of the RC are strongly networked with domestic and foreign research groups. The principal investigators are active participants of, e.g., the European Association for Clinical Pharmacology and Therapeutics, European Research Network on Pharmacogenetics/genomics, International Transporter Consortium, International Association for the Study of Pain, European Network of Teratology Information Services, and the Global Research in Paediatrics (GRIP) Network. The principal investigators were commonly invited to give talks in international congresses during 2005-2010. These and other international research collaborations have resulted in more than 40 joint publications with foreign research groups during 2005-2010 (more than 30 original articles and 10 reviews, letters and editorials).



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In addition to the doctoral theses carried out within the RC, the principal investigators have been actively participating in thesis supervision outside the RC. For example, Professor Pertti Neuvonen has co-supervised six doctoral theses for the University of Turku and one for the University of Helsinki during 2005-2010. The doctoral thesis work of Dr. Samuel Fanta, supervised by Drs. Janne Backman and Kalle Hoppu, was carried out in collaboration with the University of Uppsala, Sweden. Moreover, a number of doctoral thesis articles have been published in collaboration with international research groups (e.g., Jenni Keskitalo's work in collaboration with the University of Erlangen-Nuremberg, Germany). The RC has supported doctoral student mobility by providing funding for research stays abroad through the CDRGS or research grants. All doctoral students have presented their results in at least one international congress per year.

Collaborators:

1. Drug interactions

University of Uppsala, Sweden

- e.g., Prof. Marja-Liisa Dahl

Karolinska Institute, Stockholm, Sweden

- e.g., Prof. Anders Rane, Prof. Leif Bertilsson

Université Paris Sud, Paris, France

- e.g., Prof. Laurent Becquemont

University of Bonn, Germany

- e.g., Prof. Klaus von Bergmann

University of Turku, Finland

- e.g., Prof. Klaus Olkkola, Dr. Kari Laine

2. Pharmacogenetics

Karolinska Institute, Stockholm, Sweden

- e.g., Prof. Magnus Ingelman-Sundberg, Prof. Leif Bertilsson

Dr. Margarete Fischer-Bosch Institute of Clinical Pharmacology, Stuttgart, Germany

- e.g., Prof. Matthias Schwab, Prof. Ulrich Zanger, Prof. Michel Eichelbaum

University of Erlangen-Nuremberg, Germany

- e.g., Prof. Martin Fromm

University of Newcastle, UK

- e.g., Prof. Ann Daly

Baylor College of Medicine, Houston, Texas, United States

- e.g., Prof. Suzanne Leal

3. Pregnancy, immature body functions and fragility

GRIP network (19 collaborating centers)

University of Uppsala, Sweden

- e.g., Prof. Mats Karlsson

Queen's University of Belfast, UK- e.g., Dr. Daniel McAuley

Sackler Institute, Columbia University, New York, USA



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- RC's strengths and challenges related to research collaboration and researcher mobility, and the actions planned for their development.
The high international reputation of the RC and the high degree of networking by the principal investigators provides an excellent ground for researcher collaboration and mobility in the future. The following actions are planned for developments:

1. Strengthening international collaboration:

Internationally established research leaders will be invited to Finland for research stays or to give talks in symposia. The RC will continue to organize symposia on its focus areas, with regular invitations to foreign speakers. The RC members will actively participate in international networks and continue to present their results in international congresses.

2. Strengthening national collaboration:

Collaboration between Finnish research groups will be facilitated by union of the FinPharmaNet graduate schools to the FinPharma Doctoral Program in 2012. To enable exchange of ideas and research collaboration in pharmacogenetics, a national research network will be established. The first step was taken in 2010, when RC members organized a pharmacogenetics workshop of 40 key researchers.

5 OPERATIONAL CONDITIONS (MAX. 4400 CHARACTERS WITH SPACES)

- Description of the operational conditions in the RC's research environment (e.g. research infrastructure, balance between research and teaching duties).
The six principal investigators of the RC are connected to the Diagnostic-Therapeutic Department of the Institute of Clinical Medicine. Within the Department, J Backman (Clinical lecturer), P Neuvonen (Professor of Clinical Pharmacology and Director of the Diagnostic-Therapeutic Department) and M Niemi (Professor of Pharmacogenetics) are affiliated to the Department of Clinical Pharmacology. Also H Malm (senior physician) in the Teratology Information Service and K Hoppu (chief physician) in the Poison Information Service are connected to this university department. The position of E Kalso (Professor of Pain Research and Management, and Director of the Multidisciplinary Pain Clinic) is located in the Department of Anesthesiology (a suborganization of the Diagnostic-Therapeutic Department).

The research facilities of the Department of Clinical Pharmacology include a well-equipped clinical research unit, which is especially suitable for pharmacokinetic studies and can accommodate up to 15 research patients, and a modern research laboratory in Biomedicum Helsinki 1. The laboratory includes specialized personnel and equipment for analysis of drug and metabolite concentrations in biological samples, and for in vitro assays of drug metabolism and transport, and genotyping. The most sophisticated piece of analytical equipment is the API 3000 LC/MS/MS system, which is suitable for quantification of concentrations in the low nanomolar range and has been in extensive and continuous (24/7) use for the last 12 years. In addition, the "work-horses" of the laboratory include two API 2000 LC/MS/MS systems and several liquid chromatography systems. Moreover, the laboratory has infrastructure for preparation of DNA samples, and for genotyping (e.g., Applied Biosystems 7300 Real-Time PCR system). The facilities have been at the disposal of the whole RC, and have been crucial to the research carried out.

The RC can also directly utilize the clinical research facilities of the Pain Clinic (directed by E Kalso) and the facilities of the Poison Information and Teratology Information Centers. Moreover, the principal



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investigators have excellent connections to clinical collaborators in the Meilahti Campus (e.g., Children's Hospital and Meilahti Hospital) and to foreign research groups (e.g., Swedish, German and British groups) that have produced many joint publications.

The investigators have been heavily occupied by duties not related to research. Neuvonen and Backman have been responsible for a 7.5 international credit course of clinical pharmacology to 120-130 medical students, specialist training in clinical pharmacology, a clinical pharmacology consultation service to physicians, and expert roles in the therapeutic drug monitoring services of the Hospital laboratory. These duties have required about 30-40% of their working hours. Similarly, E Kalso has been occupied by teaching pain medicine and M Niemi has been responsible (on a national level) for teaching pharmacogenetics since 2009. Considering their clinical responsibilities, their burden of non-research duties varies from 30-60%. H Malm and K Hoppu have full time clinical affiliations with 80-90% non-research burdens.

- RC's strengths and challenges related to operational conditions, and the actions planned for their development.

The strengths of the operational conditions are the excellent laboratory facilities and the well-equipped facilities and experience of the investigators for clinical drug research. The main challenges are that the chemical analytical equipment is becoming outdated and old, and that the principal investigators can invest only part of their time for research and doctoral training.

The RC is planning to acquire funding for a highly sensitive up-to-date LC/MS/MS system (requires about 400.000 €) that would enable quantification of the very low plasma concentrations of modern drugs and quantification from very small sample volumes (which is a prerequisite for studies in children and in critically ill patients). Moreover, with acquired funding for the GRIP project (pediatric clinical pharmacology training involving doctoral training) and for a teratology research network, both Kalle Hoppu and Heli Malm will be able to increase their possibilities for research duties by 30-60% in the next four years.

6 LEADERSHIP AND MANAGEMENT IN THE RESEARCHER COMMUNITY (MAX. 4400 CHARACTERS WITH SPACES)

- Description of the execution and processes of leadership in the RC, how the management-related responsibilities and roles are distributed in the RC and how the leadership- and management-related processes support high quality research, collaboration between principal investigators and other researchers in the RC, the RC's research focus and strengthening of the RC's know-how.
All principal investigators of the RC work as independent researchers and leaders of their own research groups, with formal management-related roles in their own units. There is no formal organization in the RC. However, all the principal investigators are involved in the CDRGS graduate school and actually form the core operational unit of the CDRGS in Helsinki, and all the research of the RC is heavily dependent on collaboration between investigators and on the core laboratory facilities of the Department of Clinical Pharmacology. Accordingly, the practical operational leadership and management of the RC are localized at the Department of Clinical Pharmacology, the home unit of CDRGS (led currently by Pertti Neuvonen, and after his retirement by Janne Backman). In addition, the leadership- and management-related processes of the RC are based on the good practices of CDRGS, as described in section 2, leaving a lot of independence to the investigators.



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This kind of organization guarantees high quality of research, because this way, the facilities and the expertise/know-how of the Department of Clinical Pharmacology can be utilized by all the principal investigators. The excellence of the core facilities of the department also strongly supports the research focus of the RC. Collaboration between experts of different areas (clinical pharmacology, pharmacokinetics, pharmacogenetics, pain medicine, pediatrics, teratology) is also important for the quality of research. The CDRGS graduate school strengthens collaboration between the investigators and other researchers, because of the requirements of the graduate school for the supervision of doctoral students, and because all researchers are involved in the training provided by CDRGS. During the evaluation period 2005-2010, most of the doctoral students in the RC were supervised and co-supervised by at least 2-3 of the principal investigators, highlighting the strength of collaboration between the principal investigators.

- RC's strengths and challenges related to leadership and management, and the actions planned for developing the processes.

A major strength of the RC's leadership and management is the unique and synergistic combination of six independent principal investigators, who are all internationally known top researchers in their respective fields. The different backgrounds of the principal investigators bring synergy to the RC's research efforts aiming at a shared and coherent target: understanding variability in drug response in order to improve the safety and efficacy of drug therapy.

The main future challenges are related to the uncertainties of the interregnum time due to the retirement of Professor Pertti Neuvonen in 2011. Continuity of research during the interregnum period will be facilitated by transfer of the CDRGS leadership from Professor Neuvonen to Janne Backman.

In addition, potential challenges arise from the budgetary limitations at the University of Helsinki. Therefore, the RC aims to secure sufficient funding for doctoral student and senior researcher positions, as well as for research infrastructure and other expenses.

7 EXTERNAL COMPETITIVE FUNDING OF THE RC

- Listing of the RCs external competitive funding, where:
 - the funding decisions have been made during 1.1.2005-31.12.2010, and
 - the administrator of the funding is/has been the University of Helsinki
- Academy of Finland (AF) - total amount of funding (in euros) AF has decided to allocate to the RC members during 1.1.2005-31.12.2010: 437420
- Finnish Funding Agency for Technology and Innovation (TEKES) - total amount of funding (in euros) TEKES has decided to allocate to the RC members during 1.1.2005-31.12.2010: 220000
- European Union (EU) - total amount of funding (in euros) EU has decided to allocate to the RC members during 1.1.2005-31.12.2010: 0



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- European Research Council (ERC) - total amount of funding (in euros) ERC has decided to allocate to the RC members during 1.1.2005-31.12.2010: 0
- International and national foundations – names of international and national foundations which have decided to allocate funding to the RC members during 1.1.2005-31.12.2010, and the amount of their funding (in euros).
 - names of the foundations: Sigrid Juselius Foundation
 - Gyllenberg Foundation
 - Syöpäjärjestöt
 - Finska Läkaresällskapet
 - total amount of funding (in euros) from the above-mentioned foundations: 698350
- Other international funding - names of other international funding organizations which have decided to allocate funding to the RC members during 1.1.2005-31.12.2010, and the amount of their funding (in euros).
 - names of the funding organizations:
 - total amount of funding (in euros) from the above-mentioned funding organizations: 0
- Other national funding (incl. EVO funding) - names of other national funding organizations which have decided to allocate funding to the RC members during 1.1.2005-31.12.2010, and the amount of their funding (in euros).
 - names of the funding organizations: EVO
 - Ministry of Education and Culture
 - total amount of funding (in euros) from the above-mentioned funding organizations: 3553000

8 RC'S STRATEGIC ACTION PLAN FOR 2011–2013 (MAX. 4400 CHARACTERS WITH SPACES)

- Description of the RC's future perspectives in respect to research and doctoral training.
The vision of the IndiviDrug RC for 2011-2013 is to

1. Maintain its position as one of the internationally leading centers in the research of individual variability in drug response, in particular due to drug interactions and pharmacogenetics, reaching the international cutting edge in specific sectors.

- The research will be directed at improving patient safety and the results will be clinically applicable
- The results will improve methods of clinical drug development and will thus be useful to the pharmaceutical industry
- Relevant research findings will be transferred to patent applications

2. Maintain its position as a nationally important center for training doctors and researchers in the field of clinical drug research.

- The doctoral training will meet most of the need of doctorate level researchers and experts in the field in the health care system, health authorities and in pharmaceutical industry.



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Action plan of the RC for 2011-2013

One of the major challenges during the period 2011-2013 is the retirement of Professor Pertti Neuvonen in 2011, because his successor is not known. However, he will continue in the RC after his retirement. In addition, the leadership of the CDRGS graduate school will be transferred from him to Janne Backman, so that all the leadership arrangements of the RC will remain functional during the interregnum period.

The CDRGS will join with other FinPharmaNet graduate schools to form the FinPharma Doctoral Program in the beginning of 2012. A total of 9 doctoral student positions of the FinPharma Doctoral Program application (under evaluation) have been allocated to the Clinical Drug Research section. In addition, the RC will work to even increase its other university and hospital positions that are suitable for doctoral students. Thus, the total number of positions for doctoral students will be adequate. In addition, to complement the expertise of its present six principal investigators and to strengthen the capacity and quality of its research, the RC aims to raise external funding to recruit one or more postdoctoral researchers to the team. If necessary, hospital senior positions will be utilised in the recruitment of post-doctoral researchers.

In research, the RC will maintain its strong focus on variability in pharmacokinetics (metabolism and transport), including the significance of drug interactions and pharmacogenetics, and increase its efforts on other topics, such as the effects of pregnancy, age and other individual factors on drug response and safety. Research will be strengthened by increasing collaboration with international and national clinical units and basic research groups, and by effective utilization of sophisticated basic and clinical research methods. For example, the RC is planning to update its analytical laboratory equipment with a highly sensitive LS/MS/MS system. In addition, advanced information technology and computer intensive methods will be exploited, in order to 1) understand the relationship between molecular level findings, physiological significance and clinical relevance of variability in drug response, 2) to increase the in vitro – in vivo predictability of pharmacokinetic variability, and to increase the usefulness of basic research methods and simulations, e.g., for drug development, and 3) to integrate information concerning different sources of variability (e.g., drug interactions, pharmacogenetics, age) in order to better individualize clinical drug treatment.

In doctoral training, the CDRGS graduate school will remain as the mainstay of the high quality of training provided by the RC. The union of CDRGS with the other graduate schools to the FinPharma Doctoral Program (FPDP) will strengthen the practices of doctoral training, increase the number and quality of postgraduate courses, improve the coordination of resources and to some extent also relieve the investigators of administrative tasks. In addition, the RC aims at increasing its supervisor resources by increasing the number of its positions (see above), and via collaboration with other groups. The purpose is that doctoral student positions can be fully exploited to educate a sufficient number of doctorates in clinical drug research. Further, international collaboration in doctoral training will be increased, eg by the "Global Research in Paediatrics" program.



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9 SHORT DESCRIPTION OF HOW THE RC MEMBERS HAVE CONTRIBUTED TO THE COMPILATION OF THE STAGE 2 MATERIALS (MAX. 1100 CHARACTERS WITH SPACES).

Janne Backman had the main responsibility for the compilation of the material and he wrote the first drafts for the majority of the material. In addition, Pertti Neuvonen and Mikko Niemi made substantial contributions to drafting specific sections of the material. The other principal investigators (Kalso, Hoppu and Malm) had the possibility to comment the text so that their views could also be expressed in the text. The other RC members had the possibility to make suggestions to the contents of the material. After the commenting, Backman, Neuvonen and Niemi compiled the final material as joint work.

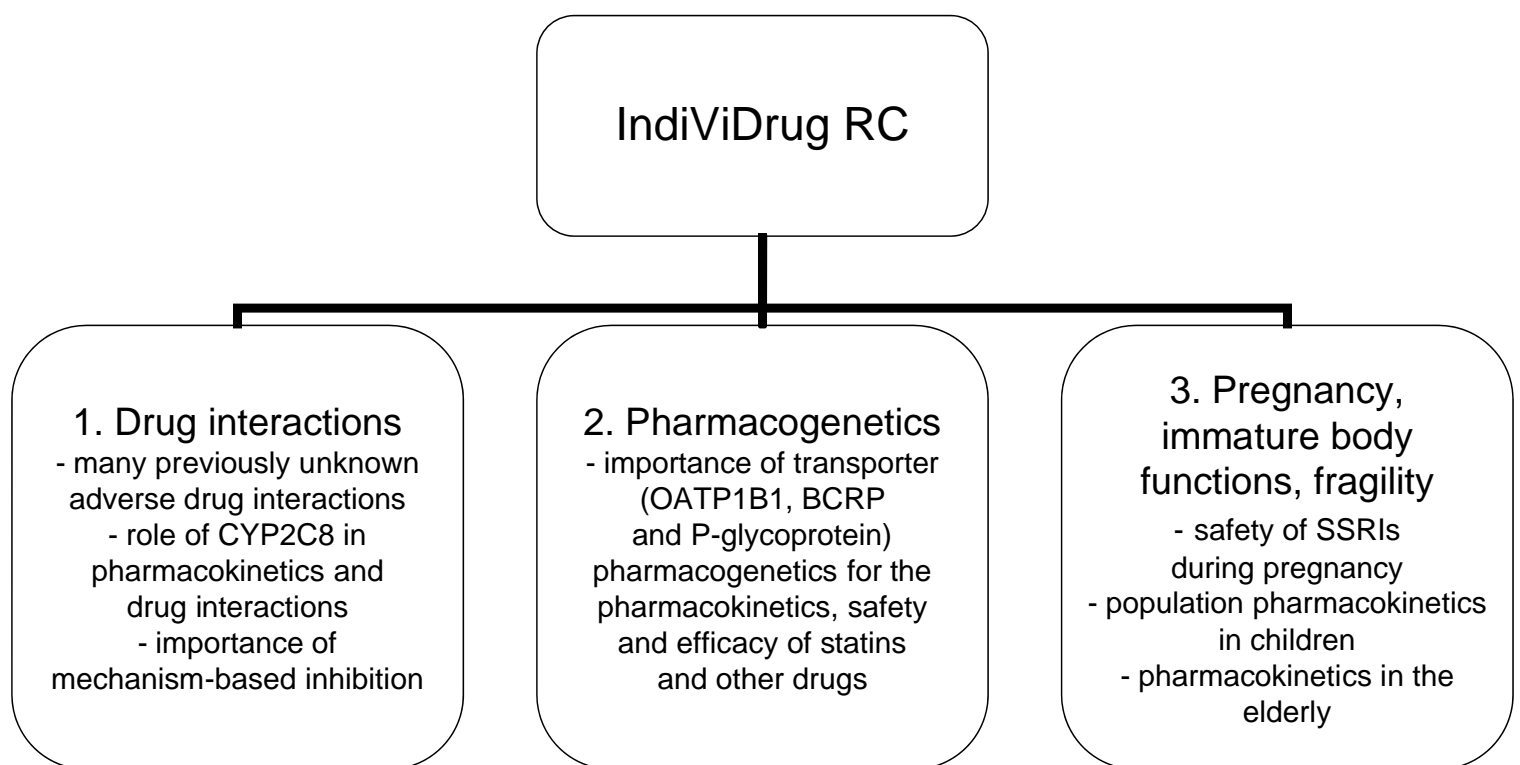


Figure 1. Main research topics and findings in the three focus areas of the IndiViDrug RC during 2005-2010.

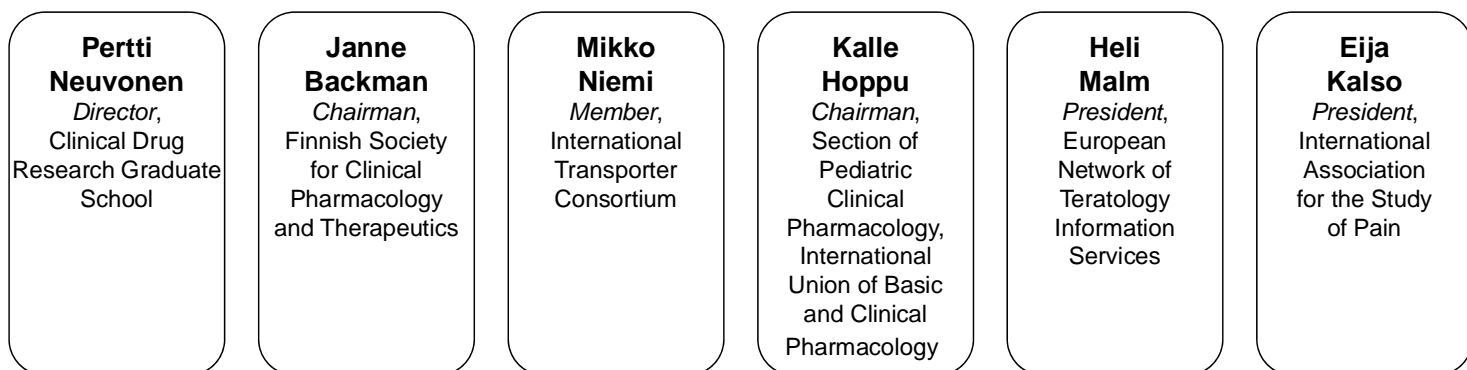


Figure 2. Positions of trust and administration of the IndiViDrug principal investigators in doctoral training organizations and scientific societies.



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RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

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1 Analysis of publications

- Associated person is one of Kati Marjukka Ahonen, Janne Backman, Samuel Israel Fanta, Anne Filppula, Heikki Isohanni, Tarja Heiskanen, Kaarlo Hoppu, Johanna Honkalammi, Mika Tiina Annikki Jaakkola, Lauri Kajosaari, Annikka Kalliokoski, Eija Kalso, Marjo Karjalainen, Tiina Karonen, Jenni Eliisa Keskitalo, Jari Lijja, Heli Malm, Pertti Neuvonen, Mikko Niemi, Marja Pasanen, Päivi Ruokoniemi, Marika Schröder, Tuija Tapaninen, Aleksi Tornio, Xiaoqiang Xiang,

Publication type	Publication year						Total Count 2005 - 2010
	2005	2006	2007	2008	2009	2010	
A1 Refereed journal article	31	41	21	40	28	24	185
A2 Review in scientific journal	2	1	5	4	3	4	19
A3 Contribution to book/other compilations (refereed)	2	6	5	3	16	1	33
B1 Unrefereed journal article	7	7	5	7	17	8	51
B2 Contribution to book/other compilations (non-refereed)						1	1
C2 Edited book, compilation, conference proceeding or special issue of journal		1		1	2	2	6
D1 Article in professional journal	4	5	8	1			18
D2 Article in professional hand or guide book or in a professional data system, or text book material	4	3		3	3	6	19
I1 Audiovisual materials						1	1



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2 Listing of publications

A1 Refereed journal article

2005

- Alaspää, A, Kuisma, M, Hoppu, K, Neuvonen, PJ 2005, 'Out-of-hospital administration of activated charcoal by emergency medical services', **Annals of Emergency Medicine**, vol 45, no. 2, pp. 207-212.
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- Granfors, M, Backman, JT, Laitila, J, Neuvonen, PJ 2005, 'Oral contraceptives containing ethinyl estradiol and gestodene markedly increase plasma concentrations and effects of tizanidine by inhibiting cytochrome P450 1A2', **Clinical Pharmacology and Therapeutics**, vol 78, no. 4, pp. 400-411.
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RC-SPECIFIC TUHAT COMPILATIONS OF PUBLICATIONS DATA 2005-2010

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I1 Audiovisual materials

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Clinical Pharmacology of pain



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RC-SPECIFIC TUHAT COMPILATIONS OF OTHER SCIENTIFIC ACTIVITIES 2005-2010

IndiViDrug/Backman

1 Analysis of activities 2005-2010

- Associated person is one of Kati Marjukka Ahonen, Janne Backman , Samuel Israel Fanta , Anne Filppula ,
Tarja Heiskanen , Kaarlo Hoppu , Johanna Honkalammi , Mika
Heikki Isohanni , Tiina Annikki Jaakkola , Lauri Kajosaari , Annikka Kallioikoski ,
Eija Kalso , Marjo Karjalainen , Tiina Karonen , Jenni Eliisa
Keskitalo , Jari Lijja, Heli Malm , Pertti Neuvonen ,
Marja Pasanen , Päivi Ruokoniemi , Marika Schröder , Mikko Niemi ,
Aleksi Tornio , Xiaoqiang Xiang , Tuija Tapaninen ,

Activity type

Supervisor or co-supervisor of doctoral thesis	56
Prizes and awards	13
Editor of research journal	19
Editor of research anthology/collection/conference proceedings	5
Peer review of manuscripts	81
Editor of special theme number	3
Assessment of candidates for academic posts	6
Membership or other role in research network	12
Membership or other role in national/international committee, council, board	29
Membership or other role in public Finnish or international organization	34
Membership or other role of body in private company/organisation	3
Participation in interview for written media	30
Participation in radio programme	4
Participation in TV programme	4
Participation in interview for web based media	22



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2 Listing of activities 2005-2010

Supervisor or co-supervisor of doctoral thesis

Janne Backman ,

Supervision of PhD thesis of Lauri Kajosaari, MD, Janne Backman, 2002 → 15.12.2005, Finland
Supervision of PhD thesis of Marika Granfors, MD, Janne Backman, 2002 → 16.12.2005, Finland
Mentoring of PhD thesis of Marja Pasanen, Janne Backman, 2003 → 2008, Finland
Supervision of PhD thesis of Alekski Tornio, MD, Janne Backman, 2003 → 29.08.2008, Finland
Supervision of PhD thesis of Marjo Karjalainen, MD, Janne Backman, 2003 → 15.08.2008, Finland
Supervision of PhD thesis of Tiina Jaakkola, MD, Janne Backman, 2003 → 24.08.2007, Finland
Mentoring of PhD thesis of Annikka Kalliokoski, Janne Backman, 2005 → 2008, Finland
Supervision of PhD Thesis of Samuel Fanta, MD, Janne Backman, 2005 → 13.11.2009
Mentoring of PhD thesis of Jenni Kesitalo, Janne Backman, 2008 → ..., Finland
Mentoring of PhD thesis of Tuija Tapaninen, Janne Backman, 2008 → ..., Finland
Mentoring of PhD thesis of Xiaoqiang Xiang, Janne Backman, 2008 → ..., Finland
Supervision of PhD thesis of Johanna Honkalammi, MD, Janne Backman, 2008 → ..., Finland
Supervision of PhD thesis of Tiina Karonen, MD, Janne Backman, 2008 → ..., Finland
Supervision of PhD thesis of Anne Filppula, MSc (pharmacy), Janne Backman, 2010 → ..., Finland

Kaarlo Hoppu ,

Participation in thesis supervision, Kaarlo Hoppu, 2008, Finland
Participation in thesis supervision, Kaarlo Hoppu, 2009, Finland

Eija Kalso ,

Supervision of doctoral thesis, Eija Kalso, 01.01.2001 → 03.11.2006, Norway
Supervision of doctoral dissertation, Eija Kalso, 2002 → 04.12.2008, Finland
Supervision of doctoral thesis, Eija Kalso, 2004 → 04.12.2009, Finland
Supervision of doctoral thesis, Eija Kalso, 2004 → 2012, Finland
Supervision of doctoral thesis, Eija Kalso, 2006 → 2012, Finland
Supervision of doctoral thesis, Eija Kalso, 2007 → 2012, Finland
Supervision of doctoral thesis, Eija Kalso, 2009 → 2012, Finland

Pertti Neuvonen ,

Supervision of PhD thesis of Mika Isohanni, MD, Pertti Neuvonen, 1996 → 28.11.2009
Supervision of PhD thesis of Heli Malm, MD, Pertti Neuvonen, 2000 → 20.12.2005
Mentoring, PhD thesis of Mia Koskinen, MD, Pertti Neuvonen, 2001 → 2006
Supervision of PhD thesis of Lauri Kajosaari, MD, Pertti Neuvonen, 2002 → 15.12.2006
Supervision of PhD thesis of Marika Granfors, MD, Pertti Neuvonen, 2002 → 16.12.2005
Supervision of PhD thesis of Alekski Tornio, MD, Pertti Neuvonen, 2003 → 29.08.2008
Supervision of PhD thesis of Marja Pasanen, MD, Pertti Neuvonen, 2003 → 19.12.2008
Supervision of PhD thesis of Marjo Karjalainen, MD, Pertti Neuvonen, 2003 → 2008
Supervision of PhD thesis of Tiina Jaakkola, MD, Pertti Neuvonen, 2003 → 24.08.2007
Mentoring, PhD thesis of Teijo Saari, MD, Pertti Neuvonen, 2004 → 2007
Mentoring, PhD thesis of Ville-Veikko Hynninen, MD, Pertti Neuvonen, 2004 → 2008



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IndiViDrug/Backman

Supervision of PhD thesis of Annikka Kalliokoski, MD, Pertti Neuvonen, 2005 → 05.12.2008

Mentoring, PhD thesis of Tuija Nieminen MD, Pertti Neuvonen, 2007 → 2010

Mentoring, PhD thesis of Antti Liukas, MD, Pertti Neuvonen, 2008 → 2011

Mentoring, PhD thesis of Juha Grönlund, MD, Pertti Neuvonen, 2008 → 2011

Supervision of PhD thesis of Jenni Keskitalo, MD, Pertti Neuvonen, 2008 → ...

Supervision of PhD thesis of Johanna Honkalampi, MD, Pertti Neuvonen, 2008 → ...

Supervision of PhD thesis of Tiina Karonen, MD, Pertti Neuvonen, 2008 → ...

Supervision of PhD thesis of Tuija Tapaninen, MD, Pertti Neuvonen, 2008 → ...

Supervision of PhD thesis of Xiaoqiang Xiang, MSc (pharmacy), Pertti Neuvonen, 2008 → ...

Mentoring, PhD thesis of Marko Peltoniemi, MD, Pertti Neuvonen, 2009 → 2011

Supervision of PhD thesis of Anne Filppula, MSc (pharmacy), Pertti Neuvonen, 2010 → ...

Mikko Niemi ,

Mentoring of PhD thesis of Lauri Kajosaari, Mikko Niemi, 2002 → 2005, Finland

Mentoring of PhD thesis of Aleksi Tornio, Mikko Niemi, 2003 → 2008, Finland

Mentoring of PhD thesis of Tiina Jaakkola, Mikko Niemi, 2003 → 2008, Finland

Supervision of PhD thesis of Marja Pasanen, Mikko Niemi, 2003 → 2008, Finland

Mentoring of PhD thesis of Samuel Fanta, Mikko Niemi, 2005 → 2009, Finland

Supervision of PhD thesis of Annikka Kalliokoski, Mikko Niemi, 2005 → 2008, Finland

Mentoring of PhD thesis of Johanna Honkalampi, Mikko Niemi, 2008 → ..., Finland

Mentoring of PhD thesis of Tiina Karonen, Mikko Niemi, 2008 → ..., Finland

Supervision of PhD thesis of Jenni Keskitalo, Mikko Niemi, 2008 → ..., Finland

Supervision of PhD thesis of Tuija Tapaninen, Mikko Niemi, 2008 → ..., Finland

Supervision of PhD thesis of Xiaoqiang Xiang, Mikko Niemi, 2008 → ..., Finland

Prizes and awards

Samuel Israel Fanta ,

Finnish Society for Clinical Pharmacology and Therapeutics, Thesis award 2009, Samuel Israel Fanta, 2009, Finland

Tarja Heiskanen ,

Suomen Lääkärilehti, vuoden kirjoitus 2009, Tarja Heiskanen, 2009 → ..., Finland

Eija Kalso ,

Konrad Reijowaara Prize, Eija Kalso, 12.2007

Finska Läkaresällskapet: best textbook in Finnish, Eija Kalso, 01.2010

Member of the Finnish Academy of Sciences, Eija Kalso, 04.2010

Pertti Neuvonen ,

Invited Member of the Finnish Academy Science and Letters (Academia Scientiarum Fennica, Suomalainen Tiedeakatemia), Pertti Neuvonen, 1998 → ..., Finland

Highly Cited Researcher (pharmacology), Thomson Reuters, ISI Web of Knowledge, Pertti Neuvonen, 2005 → ...

Mikko Niemi ,

Young Investigator Award, Mikko Niemi, 11.2009, Finland

Anders Jahre Prize for Young Scientists, Mikko Niemi, 10.2010, Norway

Marja Pasanen ,

Finnish Pharmacological Society, Doctoral thesis award 2009, Marja Pasanen, 2009, Finland



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Finnish Society for Clinical Pharmacology and Therapeutics, Doctoral thesis award 2009, Marja Pasanen, 2009, Finland

Finnish Medical Journal, Doctoral thesis award 2010, Marja Pasanen, 2010, Finland

University of Helsinki, Doctoral thesis award 2010, Marja Pasanen, 2010, Finland

Editor of research journal

Kaarlo Hoppu ,

Editor of research journal, Kaarlo Hoppu, 2004 → 2008

Editor of research journal, Kaarlo Hoppu, 2005 → ...

Editor of research journal, Kaarlo Hoppu, 2007 → ...

Annikka Kalliokoski ,

Suomen Lääkärilehti Lääkeinfo-palsta, Annikka Kalliokoski, 01.05.2009 → ...

Sic!-Lääketietolehti, Annikka Kalliokoski, 01.09.2010 → ...

Eija Kalso ,

European Journal of Pain, Eija Kalso, 01.01.1997 → ...

The Journal of Pain, Eija Kalso, 01.01.1997 → 31.12.2007

Pain, Eija Kalso, 01.01.2004 → 31.12.2011

Pertti Neuvonen ,

Clinical Pharmacokinetics, Editorial Board member, Pertti Neuvonen, 2000 → 2011

European Journal of Clinical Pharmacology, Advisory Editor, Pertti Neuvonen, 2000 → 2011, Germany

International Journal of Clinical Pharmacology and Therapeutics, Editorial Board member, Pertti Neuvonen, 2000 → 2011

Current Diabetes Reviews, Editorial Advisory Board, Pertti Neuvonen, 2005 → 2011

Mikko Niemi ,

Pharmacogenetics & Genomics, Editorial Board Member, Mikko Niemi, 2007 → ...

Pharmacogenomics, Editorial Board Member, Mikko Niemi, 2008 → ...

Expert Review of Clinical Pharmacology, Editorial Board Member, Mikko Niemi, 2009 → ...

Basic & Clinical Pharmacology & Toxicology, Editorial Board Member, Mikko Niemi, 2010 → ...

European Journal of Clinical Pharmacology, Editorial Board Member, Mikko Niemi, 2010 → ...

Frontiers in Drug Metabolism and Transport, Editorial Board Member, Mikko Niemi, 2010 → ...

Frontiers in Pharmacogenetics, Associate Editor, Mikko Niemi, 2010 → ...

Editor of research anthology/collection/conference proceedings

Janne Backman ,

The Textbook "Kliininen farmakologia ja lääkehoito" (Clinical Pharmacology and Drug Therapy, 1062 pages), Editorial Board Member, Janne Backman, 01.01.2008 → 15.01.2011, Finland

Eija Kalso ,

Proceedings of the 11th World Congress on Pain, Eija Kalso, 01.03.2005 → 31.12.2005, United States

Systematic Reviews in Pain Research: Methodology Refined, Eija Kalso, 01.01.2006 → 31.05.2008

Cancer Pain: From Molecules to Suffering, Eija Kalso, 01.12.2008 → 31.03.2010

Pertti Neuvonen ,

Chairman and member of Editorial Board of the textbook Kliininen farmakologia ja lääkehoito (Clinical Pharmacology and Drug Therapy, 1062 pages), Pertti Neuvonen, 01.01.2008 → 15.01.2011, Finland



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IndiViDrug/Backman

Peer review of manuscripts

Janne Backman ,

Clinical Drug Investigation, Reviewer (1-2 articles annually), Janne Backman, 01.06.2001 → ...
CNS Drugs, Reviewer (1-2 articles annually), Janne Backman, 01.01.2002 → 01.2006
Pharmacogenetics and Genomics, Reviewer (occasionally), Janne Backman, 01.01.2002 → ...
British Journal of Clinical Pharmacology, Reviewer (1-3 articles annually), Janne Backman, 01.01.2003 → ...
European Journal of Clinical Pharmacology, Reviewer (2-7 articles annually), Janne Backman, 01.01.2003 → ...
New England Journal of Medicine, Reviewer (1 article annually), Janne Backman, 01.01.2004 → ...
Pain, Reviewer (1-2 articles annually), Janne Backman, 01.01.2004 → ...
Basic and Clinical Pharmacology and Toxicology (1-4 articles annually), Janne Backman, 01.01.2005 → ...
Clinical Pharmacology and Therapeutics, Reviewer (2-4 articles annually), Janne Backman, 01.01.2005 → ...
Clinical Pharmacokinetics, Reviewer (1-2 articles annually), Janne Backman, 01.01.2006 → ...
Epilepsia, Reviewer (1-2 articles annually), Janne Backman, 01.01.2006 → ...
Food and Chemical Toxicology, Reviewer (1-2 articles annually), Janne Backman, 01.01.2006 → ...
Drug Metabolism and Disposition, Reviewer (2-6 articles annually), Janne Backman, 15.02.2007 → ...
Drug Safety, Reviewer, Janne Backman, 15.02.2007 → 12.2007
European Journal of Pharmaceutical Sciences, Reviewer (1-2 articles annually), Janne Backman, 15.02.2007 → ...
Expert Opinion on Drug Metabolism & Toxicology, Expert Opinion on Drug Metabolism & Toxicology, Janne Backman, 15.02.2007 → 2008
Pharmaceutical Research, Reviewer, Janne Backman, 15.02.2007 → 2008
Naunyn Schmiedeberg's Arch Pharmacol, Reviewer, Janne Backman, 31.12.2008 → 2009, Germany
Annals of Medicine, Reviewer (1-2 articles annually), Janne Backman, 19.01.2009 → ..., Finland
Chemical Research in Toxicology, Reviewer (1-2 articles annually), Janne Backman, 19.04.2009 → ..., United States
Journal of Clinical Pharmacology, Reviewer (1-2 articles annually), Janne Backman, 07.10.2009 → ..., United States
Pharmacogenomics, Reviewer (1-2 articles annually), Janne Backman, 19.05.2009 → ...
Thrombosis Research, Reviewer (1-2 articles annually), Janne Backman, 13.08.2009 → ...

Samuel Israel Fanta ,

American Journal of Clinical Pharmacology, Samuel Israel Fanta, 2010 → ...

Tarja Heiskanen ,

Duodecim, Tarja Heiskanen, 2008 → ..., Finland
Pain, Tarja Heiskanen, 2009 → ...
Suomen Lääkärilehti, Tarja Heiskanen, 2009 → ..., Finland

Kaarlo Hoppu ,

Acta Paediatrica, Kaarlo Hoppu, 2005 → ...
Archives of diseases in Childhood, Kaarlo Hoppu, 2005 → ...
British Journal of Clinical Pharmacology, Kaarlo Hoppu, 2005 → ...
Clinical Pharmacology and Therapeutics, Kaarlo Hoppu, 2005 → ...
Clinical Toxicology, Kaarlo Hoppu, 2005 → ...
Duodecim, Kaarlo Hoppu, 2005 → ..., Finland
European Journal of Clinical Pharmacology, Kaarlo Hoppu, 2005 → ...
Indian Journal of Medical Research, Kaarlo Hoppu, 2005 → ...
International Journal of Clinical Pharmacology and Therapeutics, Kaarlo Hoppu, 2005 → ...



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Journal of Pediatrics, Kaarlo Hoppu, 2005 → ...

Lancet, Kaarlo Hoppu, 2005 → ...

Pediatrics, Kaarlo Hoppu, 2005 → ...

Suomen Lääkärilehti, Kaarlo Hoppu, 2005 → ..., Finland

Eija Kalso ,

Anesthesia and Analgesia, Eija Kalso, 01.01.2000 → 31.12.2011, United States

British Medical Journal, Eija Kalso, 01.01.2003 → 31.12.2011

Acta Anaesthesiologica Scandinavica, Eija Kalso, 01.01.2004 → 31.01.2011

Journal of Pain and Symptom Management, Eija Kalso, 01.01.2004 → 31.12.2011

Anesthesia and Analgesia, Eija Kalso, 01.01.2005 → 31.12.2011, United States

Anesthesiology, Eija Kalso, 01.01.2005 → 31.12.2011, United States

Journal of Pain, Eija Kalso, 01.01.2008 → 31.12.2011

Proceedings of the National Academy of Sciences, Eija Kalso, 01.01.2010 → 31.12.2010

Jari Lilja

British Journal of Clinical Pharmacology (1-3 articles annually), Jari Lilja, 01.01.2005 → ...

Clinical pharmacology and therapeutics (1-3 articles annually), Jari Lilja, 01.01.2005 → ...

Journal of pharmacy and pharmacology (1-3 articles annually), Jari Lilja, 01.01.2005 → ...

Pertti Neuvonen ,

Clinical Pharmacokinetics, reviewer, Pertti Neuvonen, 1980 → 2010

European Journal of Clinical Pharmacology, reviewer, Pertti Neuvonen, 1980 → 2010

Suomen Lääkärilehti, Pertti Neuvonen, 1990 → 2010, Finland

Basic and Clinical Pharmacology and Toxicology, reviewer, Pertti Neuvonen, 2000 → 2010

International Journal of Clinical Pharmacology and Therapeutics, reviewer, Pertti Neuvonen, 2000 → 2010

Human and Experimental Toxicology, Pertti Neuvonen, 2004 → 2005, United Kingdom

British Journal of Clinical Pharmacology, reviewer, Pertti Neuvonen, 2005 → 2010

Clinical Pharmacology & Therapeutics, reviewer, Pertti Neuvonen, 2005 → 2010

Drugs, reviewer, Pertti Neuvonen, 2005 → 2010

Annals of Medicine, reviewer, Pertti Neuvonen, 2010 → 2011

Chemical Research and Toxicology, reviewer, Pertti Neuvonen, 2010 → ...

Expert Opinion on Drug Metabolism and Toxicology, reviewer, Pertti Neuvonen, 2010 → ...

Xenobiotica, reviewer, Pertti Neuvonen, 2010 → ...

Mikko Niemi ,

British Journal of Clinical Pharmacology, Mikko Niemi, 2005 → ...

Current pharmacogenomics, Mikko Niemi, 2005 → ...

Drug Safety, Mikko Niemi, 2005 → ...

Journal of Clinical Pharmacology, Mikko Niemi, 2005 → ...

Naunyn-Schmiedeberg's Archives of Pharmacology, Mikko Niemi, 2005 → ...

Pharmacogenetics & Genomics, Mikko Niemi, 2005 → ...

Pharmacological research, Mikko Niemi, 2005 → ...

Clinica Chimica Acta, Mikko Niemi, 01.01.2006 → ...

Clinical Pharmacokinetics, Mikko Niemi, 2006 → ...



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Clinical Pharmacology & Therapeutics, Mikko Niemi, 2006 → ...
European Journal of Clinical Pharmacology, Mikko Niemi, 2006 → ...
Arteriosclerosis, Thrombosis, and Vascular Biology, Mikko Niemi, 2008 → ...
British Journal of Pharmacology, Mikko Niemi, 2008 → ...
Pharmacogenomics, Mikko Niemi, 2008 → ...
The Journal of Clinical Investigation, Mikko Niemi, 2009 → ...
The Pharmacogenomics Journal, Mikko Niemi, 2009 → ...
Drug Metabolism & Disposition, Mikko Niemi, 2010 → ...

Editor of special theme number

Eija Kalso ,

Drug Discovery Today: Disease Mechanisms, Eija Kalso, 01.01.2005 → 31.01.2005, Netherlands

Mikko Niemi ,

British Journal of Pharmacology, Mikko Niemi, 2008

Duodecim, Mikko Niemi, 11.2008, Finland

Assessment of candidates for academic posts

Janne Backman ,

Reviewer for Docentship, Tapio Kuitunen, Janne Backman, 11.2008 → 04.2009, Finland

Kaarlo Hoppu ,

Assessment of candidates for associate professorship, Kaarlo Hoppu, 2008, Australia

Pertti Neuvonen ,

Evaluation of candidate for the Professorship in Pharmacology, University of Helsinki, Pertti Neuvonen, 2007

Reviewer for Docentship, Esko Kankuri, Pertti Neuvonen, 15.09.2009 → 15.11.2009

Reviewer for Professorship (fixed term), Pertti Neuvonen, 01.10.2009 → 25.11.2009

Evaluation of candidate for the Professorship in Pharmacology, University of Turku, Pertti Neuvonen, 10.03.2010 → 24.04.2010

Membership or other role in research network

Janne Backman ,

Pharmacokinetic variability research network, member, Janne Backman, 2005 → ...

Kaarlo Hoppu ,

Global Research in Paediatrics (GRIP), Kaarlo Hoppu, 2009 → ...

Heli Malm ,

European Network of Teratology Information Services (ENTIS), Heli Malm, 1997 → ...

Organization of Teratology Information Specialists in North America (OTIS), Heli Malm, 1997 → ...

European Network of Centres for Pharmacoepidemiology and Pharmacovigilance (ENCePP), Heli Malm, 2006 → ...

Serotonergic Modulation of Brain Development : Genetic and Pharmacologic Influences on structure, function and behavior, Heli Malm, 2010 → ...

Pertti Neuvonen ,

Member of Drug Interaction Research Group, Pertti Neuvonen, 1990 → 2011

Professor of Clinical Pharmacology, University of Helsinki, Pertti Neuvonen, 1992 → 2011

Board Member of the Clinical Drug Research Graduate School, Pertti Neuvonen, 1995 → 2011

Founder and Leader of the Clinical Drug Research Graduate School, Pertti Neuvonen, 01.01.1995 → 2011, Finland



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IndiViDrug/Backman

Mikko Niemi ,

European Research Network on Pharmacogenetics/genomics, Mikko Niemi, 2007 → ...

International Transporter Consortium, Mikko Niemi, 2008 → ...

Membership or other role in national/international committee, council, board

Janne Backman ,

Ethics Committee for Studies in Healthy Subjects and Primary Care, member and secretary, Janne Backman, 12.1999 → 04.2005

Clinical Drug Research Graduate School, Board member, Janne Backman, 01.2005 → ...

Coordinating Ethics Committee, Member, Janne Backman, 04.2005 → 30.09.2010

Finnish Society for Clinical Pharmacology and Therapeutics, Board Member, Janne Backman, 15.03.2007 → ..., Finland

EACPT, Delegate to the Council, Janne Backman, 2009 → ...

Finnish Society for Clinical Pharmacology and Therapeutics, Chairman, Janne Backman, 19.03.2010 → ..., Finland

National Committee on Medical Research Ethics, Member, Janne Backman, 01.10.2010 → ...

Kaarlo Hoppu ,

IUPHAR, Sub-Committee for Paediatric Clinical Pharmacology, Board, Chairman 2004-2010., Kaarlo Hoppu, 2004 → 2010

EMA/CHMP, Paediatric Working Party (PEG), Vice Chairperson, Kaarlo Hoppu, 2005 → 2007

FINPEDMED - Finnish Investigators Network for Pediatric Medicines, leader 2007-2010, Kaarlo Hoppu, 2007 → 2010

European Society for Developmental Pharmacology (ESDP), Board member; 2008, Kaarlo Hoppu, 2008

European Association of Poisons Centres and Clinical Toxicologists (EAPCCT), Scientific Committee, Member 2010-, Kaarlo Hoppu, 2010 → ...

IUPHAR, Section of Pediatric Clinical Pharmacology, Chairman 2010-, Kaarlo Hoppu, 2010 → ...

Annikka Kalliokoski ,

Lääkäripäivät 2009 ja 2010 "Lääkehoidon ajankohtaisia kysymyksiä", Annikka Kalliokoski, 01.05.2008 → ...

Kelan sosiaalilääketieteellinen neuvottelukunta ja sen lääkejaosto, Annikka Kalliokoski, 01.03.2010 → ...

Lääkepolitiikka 2020-valmisteluryhmät, Annikka Kalliokoski, 03.05.2010 → 31.12.2010

Eija Kalso ,

Suomen Kivututkimusyhdistys, tutkimustoimikunnan pj, Eija Kalso, 01.01.2001 → 31.12.2011, Finland

Scandinavian Society for Anaesthesiology and Intensive Care Medicine, Postgraduate Course in Pain Management, board member, Eija Kalso, 01.01.2002 → 31.12.2010

International Association for the Study of Pain, councillor, Eija Kalso, 01.01.2003 → 31.12.2008, United States

International Association for the Study of Pain, president, Eija Kalso, 01.01.2009 → 31.12.2014, United States

Heli Malm ,

European Network of teratology Information Services (ENTIS), Heli Malm, 2009 → ...

Pertti Neuvonen ,

Board Member, Finnish Society of Clinical Pharmacology, Pertti Neuvonen, 1994 → 2009

Chairman, Coordinating Ethics Committee of the HUS Hospital District, Pertti Neuvonen, 2000 → 2005

Director of the Diagnostic-Therapeutic Department, Institute of Clinical Medicine, Faculty of Medicine, Pertti Neuvonen, 2002 → 2011

Member of Steering Committee - MD PhD Program of the Faculty of Medicine, University of Helsinki, Pertti Neuvonen, 2007 → 2011

Member of Scientific Board, Helsinki University Pharmacy Grant Committee, Pertti Neuvonen, 01.01.2010 → 31.12.2010

Mikko Niemi ,

Coordinating Ethics Committee, Member, Mikko Niemi, 2009 → ...



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IndiViDrug/Backman

Finnish Society of Clinical Pharmacology, Secretary, Mikko Niemi, 2010 → ..., Finland

Pharmaceutical Policy 2020 Working Group, Mikko Niemi, 2010, Finland

Membership or other role in public Finnish or international organization

Janne Backman ,

Expert Group on Therapeutic Drug Monitoring, HUSLAB, Member, Janne Backman, 2004 → ...

Finnish Medicines Agency, Expert reviewer, Janne Backman, 01.01.2005 → 31.12.2007, Finland

Expert group on cardiovascular medicines, diuretics and cholesterol-lowering agents, Member, Janne Backman, 01.2009 → 12.2009, Finland

Expert group on Therapeutic Drug Monitoring, HUSLAB, Chairman, Janne Backman, 03.2010 → ...

Parliamentary Committee for Social Affairs and Health, Expert, Janne Backman, 02.03.2010

Samuel Israel Fanta ,

Finnish Medicines Agency, expert reviewer, Samuel Israel Fanta, 2010, Finland

Tarja Heiskanen ,

HYKS-alueen Saattohoitoyöryhmä, jäsen, Tarja Heiskanen, 2010 → ..., Finland

Kaarlo Hoppu ,

WHO Geneva, Sveitsi, Expert Advisory Panel on Drug Evaluation, Member 2007-, Kaarlo Hoppu, 2007 → ...

Tiina Annikki Jaakkola ,

Terveiden koehenkilöiden ja perusterveydenhuollon eettinen toimikunta, HUS, Tiina Annikki Jaakkola, 01.05.2005 → 04.05.2005, Finland

Annikka Kalliokoski ,

Lääkelaitos, Annikka Kalliokoski, 01.01.2006 → 31.12.2006

Lääkelaitos, Annikka Kalliokoski, 01.01.2007 → ...

Eija Kalso ,

Lääkelaitos/FIMEA, Eija Kalso, 01.01.2004 → 2011, Finland

Terveystieteiden tutkimuskeskus, Eija Kalso, 01.01.2004 → 30.11.2008

Potilasvahinkolautakunta, Eija Kalso, 01.01.2005 → 31.12.2011, Finland

University of Rochester: Neuropathic pain treatment guidelines, Eija Kalso, 03.04.2005 → 04.04.2005, United States

Yliopiston Apteekin hallituksen jäsen, Eija Kalso, 12.2006 → 12.2009, Finland

HUSLABin hallituksen jäsen, Eija Kalso, 2007 → 2012, Finland

University of Rochester, Eija Kalso, 31.05.2007 → 02.06.2007, United States

Sosiaali- ja terveysalan lupa- ja valvontavirasto VALVIRA, Eija Kalso, 01.12.2008 → 30.11.2012, Finland

Jari Lilja

Lääkelaitos, Jari Lilja, 01.01.2005 → 31.12.2005, Finland

Pertti Neuvonen ,

Person in charge for specialist training in Clinical Pharmacology and Drug Therapy, Faculty of Medicine, University of Helsinki, Pertti Neuvonen, 1992 → 2011

Member of the Helsinki and Uusimaa hospital district drug formulary committee, Pertti Neuvonen, 1993 → 2011

Member of Advisory Board of Social Insurance Institution (KELA:n Sos. lääket. neuvottelukunnan jäsen), Pertti Neuvonen, 1996 → 2009

Member of Drug Committee of Social Insurance Institution (KELA:n Sos.lääket. neuvottelukunnan Lääkejaoston jäsen), Pertti Neuvonen, 1996 → 2010

Chairman of the Coordinating Ethics Committee of the Helsinki and Uusimaa Hospital District, Pertti Neuvonen, 2000 → 2005, Finland

Member of the Coordinating Ethics Committee of the Helsinki and Uusimaa Hospital District, Pertti Neuvonen, 2000 → 2005, Finland



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IndiViDrug/Backman

Board Member, Institute of Clinical Medicine, University of Helsinki, Pertti Neuvonen, 2003 → 2011
STM:n lääke-, logistiikka- ja mater. jaosto, Pertti Neuvonen, 2003 → 2006, Finland
ROHTO neuvottelukunta, Pertti Neuvonen, 2004 → 2009, Finland
Secretary of the Medicine Section, Finnish Academy of Science and Letters, Pertti Neuvonen, 2005 → 2009
Suomen kulttuurirahasto, Pertti Neuvonen, 01.01.2006 → 31.12.2006, Finland
Vice Director, Institute of Clinical Medicine, University of Helsinki, Pertti Neuvonen, 2006 → 2011
Board Member of the Helsinki and Uusimaa Hospital District Pharmacy, Pertti Neuvonen, 2009 → 2011
Board Member of the HYKS-hospital district, Pertti Neuvonen, 2010 → 2011

Membership or other role of body in private company/organisation

Eija Kalso ,

International Association for the Study of Pain, Eija Kalso, 22.08.2002 → 31.12.2011, United States
European Opioid Conference, Eija Kalso, 14.02.2005 → 31.12.2011, United Kingdom

Marja Pasanen ,

Lääketieteen kandidaattiseura, Marja Pasanen, 01.01.2005 → 31.12.2005, Finland

Participation in interview for written media

Janne Backman ,

Aesculapius -journal, Interview, Janne Backman, 2009, Finland
Sanomalehti Kaleva, Interview, Janne Backman, 31.07.2009, Finland
Sanomalehti Karjalainen, Interview, Janne Backman, 12.07.2009, Finland
Suomen Lääkärilehti (Finnish Medical Journal), Interview, Janne Backman, 2009, Finland
Apteekkari -journal, Interview, Janne Backman, 2010, Finland
Reseptori -journal, Interview, Janne Backman, 2010, Finland
Terveystieteiden -journal, Interview, Janne Backman, 2010, Finland

Samuel Israel Fanta ,

Ilta-lehti, Samuel Israel Fanta, 05.07.2007, Finland

Kaarlo Hoppu ,

Helsingin Sanomat, Kaarlo Hoppu, 18.02.2006, Finland
Helsingin Sanomat, Kaarlo Hoppu, 10.01.2007, Finland
Helsingin Sanomat, Kaarlo Hoppu, 01.02.2008, Finland
Keski-Suomalainen, Kaarlo Hoppu, 25.02.2008, Finland
Kainuun Sanomat, Kaarlo Hoppu, 01.09.2009, Finland
Uusi Suomi, Kaarlo Hoppu, 08.04.2009, Finland

Eija Kalso ,

Studia Medicina, Eija Kalso, 19.04.2006, Finland

Heli Malm ,

KELA- lehdistötiedote, Heli Malm, 13.06.2003 → ..., Finland
YLEn uutiset, Heli Malm, 13.06.2003 → ..., Finland

Pertti Neuvonen ,

Interview (by Juha Merimaa) about Highly Cited Scientists in University of Helsinki, Pertti Neuvonen, 2010, Finland
Interview (by Marita Kokko) about Top Science regarding Drug Interactions for the periodical "Apteekin Hyllyltä", Pertti Neuvonen, 09.2010 → 10.2010, Finland



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IndiViDrug/Backman

Mikko Niemi ,

Viikon kollega, Mikko Niemi, 11.2008, Finland
Dinosaurusten aika on ohi, Mikko Niemi, 08.2010, Finland
Geenitestaus mullistaa lääkehoidon, Mikko Niemi, 01.2010, Finland
Lääkkeet geenien mukaan, Mikko Niemi, 10.2010, Finland
Nopea testi löytää geenivirheen, Mikko Niemi, 04.2010, Finland
Perintötekijät vaikuttavat lääkkeiden tehoon ja turvallisuuteen, Mikko Niemi, 06.2010, Finland

Marja Pasanen ,

Duodecim, Marja Pasanen, 2007, Finland
Helsingin Sanomat, Marja Pasanen, 18.12.2008, Finland
Suomen Lääkärilehti, Marja Pasanen, 2009, Finland
Suomen Lääkärilehti, Marja Pasanen, 2010, Finland
Yliopistolehti, Marja Pasanen, 2010, Finland

Participation in radio programme

Eija Kalso ,

Yleisradion haastattelu, Eija Kalso, 07.10.2005 → 31.12.2011, United States
YLE Radio Peili, Eija Kalso, 02.06.2006 → 31.12.2011, Finland

Pertti Neuvonen ,

Interview (by Katariina Lahtonen) about "Drug interactions" in Radio Suomi, Ajantasa and YLE Areena, Pertti Neuvonen, 15.12.2010, Finland

Mikko Niemi ,

Reseptori, Mikko Niemi, 07.2010, Finland

Participation in TV programme

Janne Backman ,

"Akuutti"-TV-program, Interview, Janne Backman, 02.06.2006, Finland

Kaarlo Hoppu ,

Yle; Sienikoulu, Kaarlo Hoppu, 2007, Finland

Heli Malm ,

Yle aamu-tv, Heli Malm, 23.11.2010, Finland

Pertti Neuvonen ,

Interview by TV (Nelosen Uutiset) about toxicity of hand disinfectants in children, Pertti Neuvonen, 22.09.2009, Finland

Participation in interview for web based media

Janne Backman ,

Ilta-lehti -journal, Interview, Janne Backman, 22.07.2009, Finland

Samuel Israel Fanta ,

Helsingin Sanomat, Samuel Israel Fanta, 05.01.2007, Finland
Kaleva, Samuel Israel Fanta, 04.07.2007, Finland
Helsingin Sanomat, Samuel Israel Fanta, 03.08.2008, Finland
Ilkka, Samuel Israel Fanta, 08.04.2009, Finland



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IndiViDrug/Backman

Kaarlo Hoppu ,

Helsingin Sanomat, Kaarlo Hoppu, 14.04.2006, Finland
Helsingin Sanomat, Kaarlo Hoppu, 09.10.2007, Finland
Helsingin Sanomat, Kaarlo Hoppu, 09.10.2007, Finland
Helsingin Sanomat, Kaarlo Hoppu, 25.05.2007, Finland
Helsingin Sanomat, Kaarlo Hoppu, 09.10.2007, Finland
Suomen Lääkärilehti, Kaarlo Hoppu, 23.08.2007, Finland
mtv3.fi/uutiset, Kaarlo Hoppu, 02.10.2007, Finland
Helsingin Sanomat, Kaarlo Hoppu, 02.09.2009, Finland
Helsingin Sanomat, Kaarlo Hoppu, 02.09.2009, Finland
Yle, Kaarlo Hoppu, 26.08.2009, Finland
Suomen Lääkärilehti, Kaarlo Hoppu, 21.01.2010, Finland
mtv3.fi/uutiset, Kaarlo Hoppu, 16.06.2010, Finland

Heli Malm ,

Yle Terveys, Heli Malm, 14.12.2005, Finland
Helsingin sanomat, Heli Malm, 16.11.2010, Finland
Uusi Suomi, Heli Malm, 23.11.2010, Finland
mtv3.fi/uutiset, Heli Malm, 08.11.2010, Finland

Mikko Niemi ,

Tieteen näkökulma, Mikko Niemi, 01.2010, Finland



INTERNATIONAL EVALUATION OF RESEARCH AND DOCTORAL TRAINING AT THE UNIVERSITY OF HELSINKI

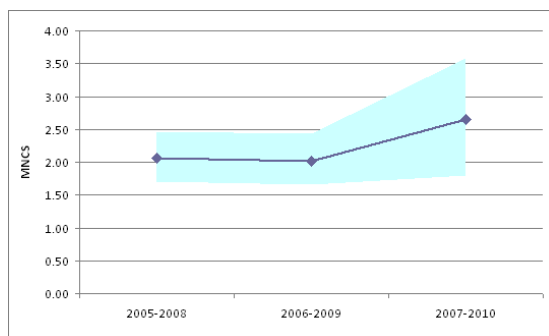
Web of Science(WoS)-based bibliometrics of the RC's publications data 1.1.2005-31.12.2010
by CWTS, Leiden University, the Netherlands

Research Group: Backman J

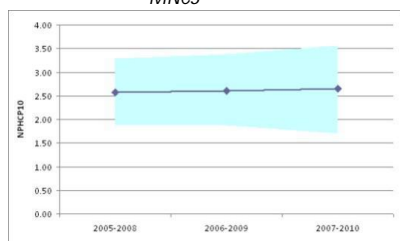
Basic statistics

Number of publications (P)	184
Number of citations (TCS)	2,327
Number of citations per publication (MCS)	13.02
Percentage of uncited publications	11%
Field-normalized number of citations per publication (MNCS)	2.38
Field-normalized average journal impact (MNJS)	1.58
Field-normalized proportion highly cited publications (top 10%)	2.70
Internal coverage	.91

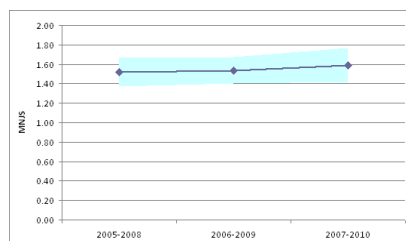
Trend analyses



MNCS

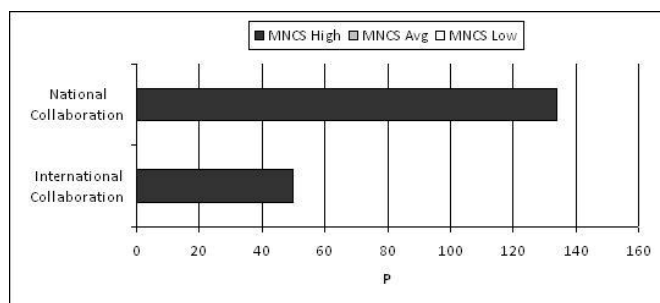


THCP10



MNJS

Collaboration



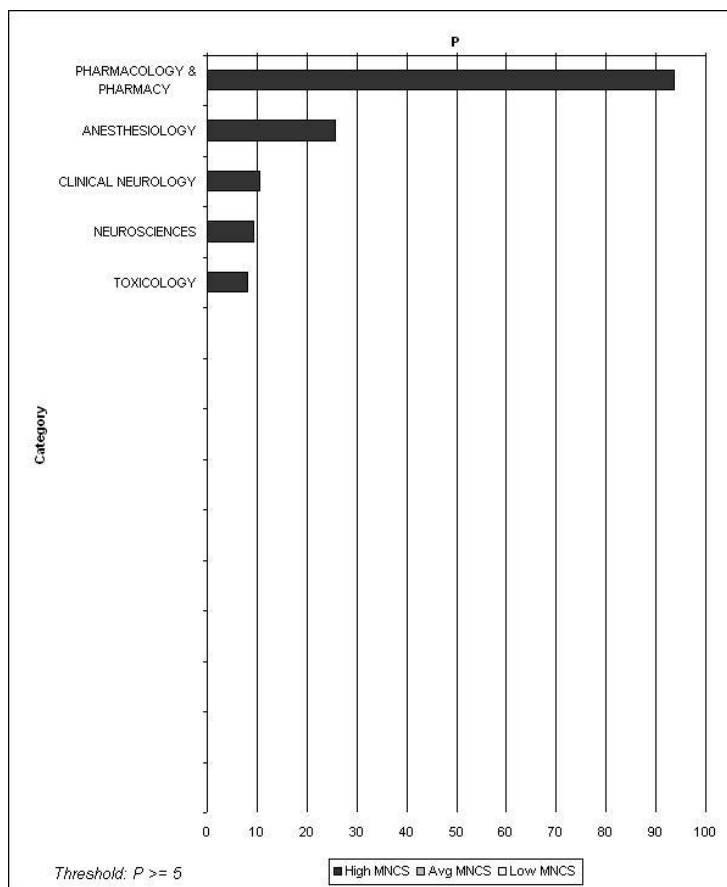
Performance (MNCS) by collaboration type



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Research profile



University of Helsinki
Administrative Publications 80/31
Evaluations

ISBN 978-952-10-7451-6 (PDF)
ISSN 1795-5513 (Online)

Internet address:

http://www.helsinki.fi/julkaisut/aineisto/rc_evaluation2012/hallinnon_julkaisuja_80_31_2012.pdf



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